

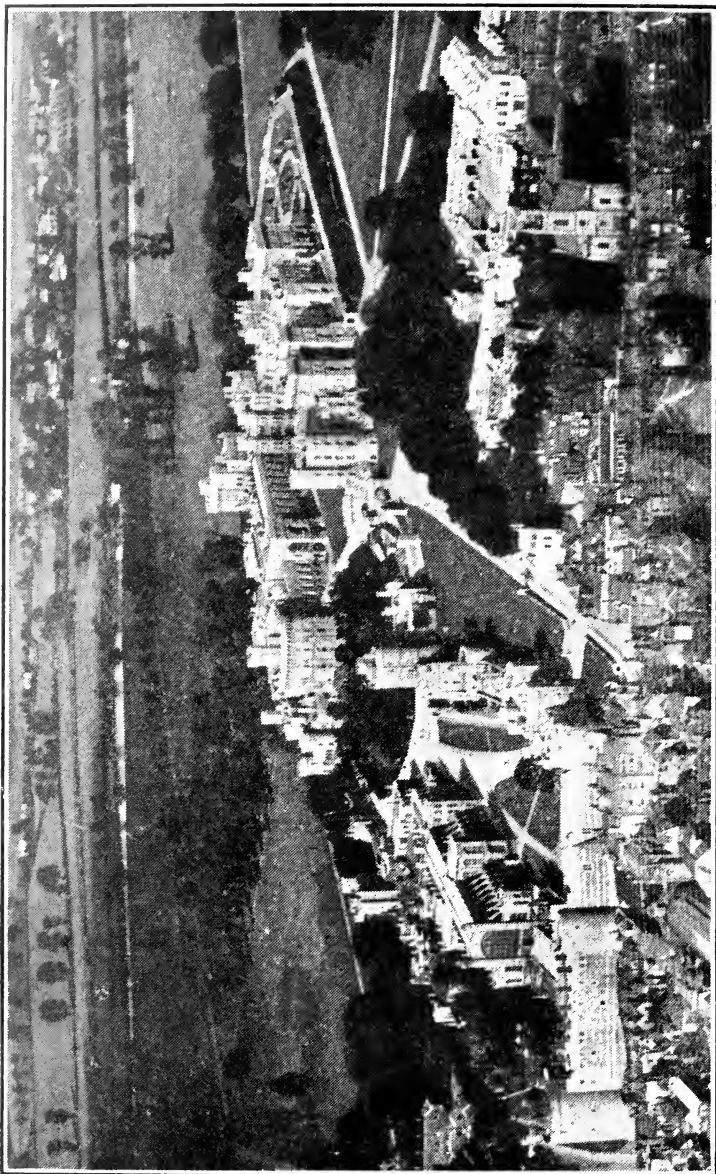
THE KINGSWAY SERIES

# GEOGRAPHY OF THE HOMELAND



BY  
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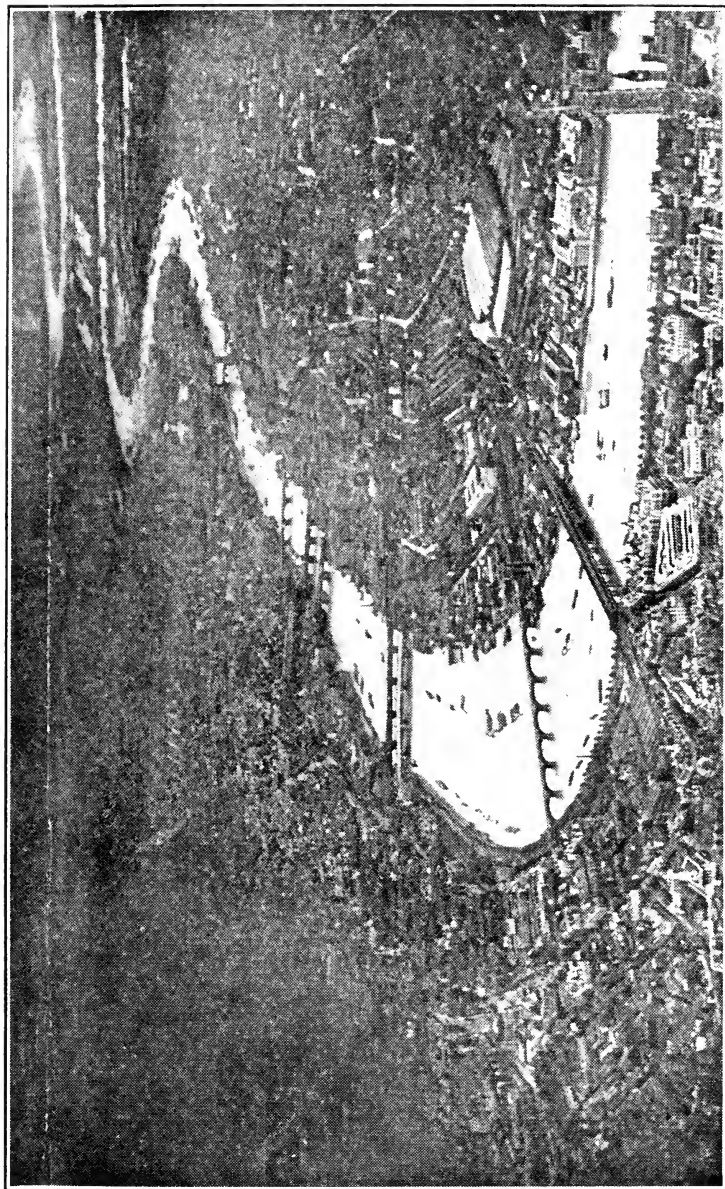
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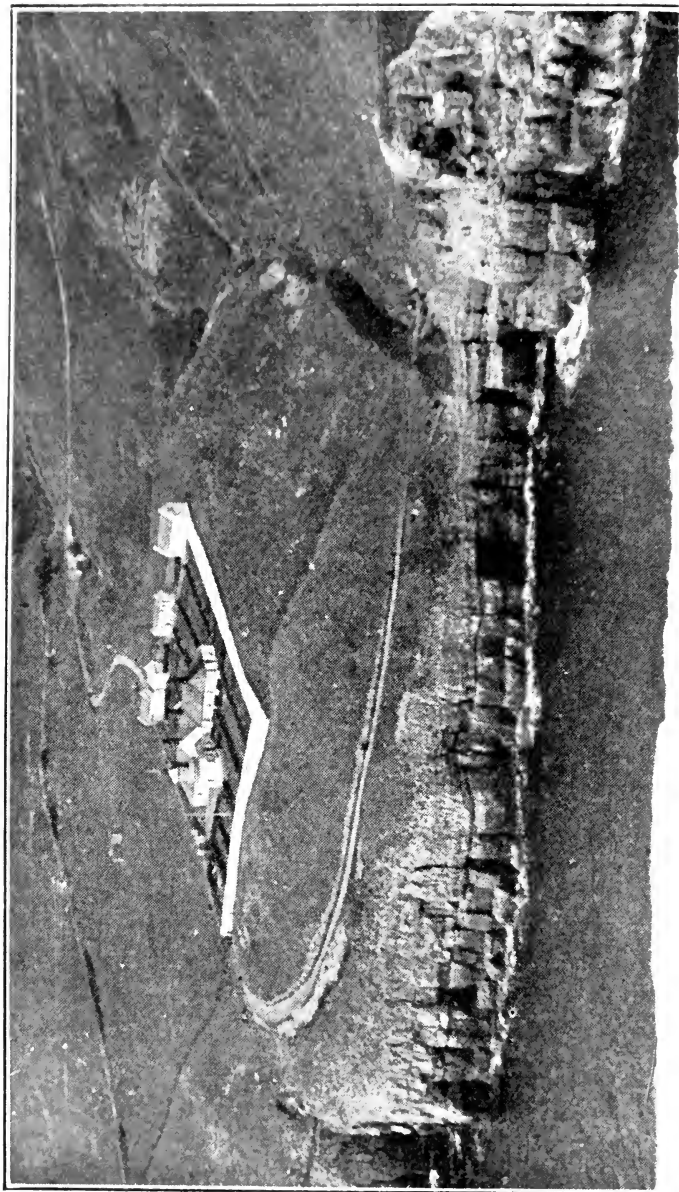
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# GEOGRAPHY OF THE HOMELAND

BY ROBERT J. <sup>James</sup> FINCH, F.R.G.S.



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# GENERAL SURVEY

## THE HOMELAND ON THE GLOBE

**F**IND the British Isles on the globe. They are so small that we take some time to find them, until we know exactly where to look for them. Yet these islands, which seem so unimportant on the globe, are the Homeland of the English-speaking peoples, and the heart of an Empire which is the greatest the world has ever known.

What zone are they in ? What does this tell us about the kind of life people will lead there, supposing we did not know ? How does their life differ from that lived by the negro of Africa, or the Eskimo, or the Hindu ? What is it that makes the difference ? The temperate climate of the British Isles enables men to put forth their best work—work of brain and work of body. They are not constantly fighting against Nature for food, clothing, and shelter like the Eskimo ; they have time for learning, time for art, time for study, and for hundreds of other things that make life worth living. Dwellers in Britain must work for their living ; they cannot hunt in forests and live on what they catch or find there, like the negroes of Central Africa. If they want corn they must not only sow it and tend it, they must reap it and store it. For in our part of the globe there is winter to think about ; winter, when no corn grows, for which we must prepare both by storing up our own and by buying a great deal from other countries. The negro has no winter to fear ; in his land fruits and seeds and grains grow at all times of the year, and hunting is always possible.

Look at the globe again. Notice the great ocean that lies to the west and the names of the important countries on the other side of that ocean. To the east lies a continent which is really only the western part of a

## *Geography of the Homeland*

much larger one which some people like to call Eurasia (Europe and Asia). These two facts—(1) the presence of a great ocean on the west, with rich and important lands on the other side of it; and (2) the presence of a continent, separated from Britain only by narrow seas—are the two great facts which explain why Britain is what she is. We shall constantly have to go back to these two great facts if we want to understand clearly the geography of our Homeland.

Is there any other country on the globe which has the same kind of position as ours? Not a single one. That is why Britain, and Britain alone, among the nations has become greater in world history and world trade than the rest. The position of Japan is very like that of our Homeland, but how does it differ? The globe will tell you all about it.

### THE HOMELAND ON THE MAP OF THE WORLD

Now look at the map of the world. Here we have the surface of the globe laid out flat. It is a difficult matter for map-makers to draw it accurately, because the globe has a curved surface, while the map has a flat one. Perhaps the map we are looking at seems a little queer when we compare it with the globe, especially if we look at the shapes and the sizes of the continents. The map-maker has had to stretch out or squeeze up, as it were, certain parts, in order to make the curved surface of the earth a flat one.

You *may* have a map which shows the world in two hemispheres, or halves. This map is much more like the globe itself than the oblong map which shows it all at once.

But whichever map it is, notice the things on it that we spoke of when dealing with the position of Britain on the globe. Find what lands lie in the same belt;

## *General Survey*

notice Canada and the United States especially; notice what lands in the continents of Europe and Asia are about the same distance as Britain is from the Equator. Look carefully at Japan again, and see how its position differs from that of our Homeland.

### THE HOMELAND ON THE MAP OF EUROPE

Now turn to the map of Europe. Notice how the Homeland lies off its western shores—an archipelago on the Atlantic fringe of Middle Europe. Where is the sea passage shortest between Britain and the Continent? Where is it greatest? Which European countries lie on the other side of the North Sea (1) opposite Scotland, (2) opposite England? Compare the width of the North Sea with that of the Irish Sea at its widest part.

If our map shows sea depths we can learn one or two important things about British seas. First of all, they are all shallow, except in one or two places. If we want to find really deep ocean water we must look about 100 miles west of Ireland, where the shallow sea becomes suddenly deep. The line that marks the extent of the shallow seas (water not deeper than 600 feet) is really the submarine 'coastline' of Europe. Part of Western Europe has slowly sunk beneath the sea in past ages—long before the coming of the first men on the earth, very probably. This sunken part forms a sort of undersea platform upon which the islands of our Homeland rest—they are really the upper parts of mountains and hills standing waist deep in water.

So before the sinking of this part of the European continent Britain was part of the mainland. Had men been living at that time they might have walked dryshod from Holland, or France, or Belgium to the west of Ireland. We know that animals did, for their bones have been dredged up from the bed of the North

## *Geography of the Homeland*

Sea. But these animals were mostly creatures whose kind has long since died out. It is just as well: for many of them were the huge and terrible monsters whose bones we see set up in some of our museums.

Look again at the map of Europe. Notice how very near we are to the Continent. We know what happened to Belgium and to Northern France when the German hordes swept westward and southward in the early days of the War. Belgium's fate might have been ours but for the geographical accident that set the 'silver streak' between our Homeland and the Continent of Europe. That narrow strait and channel were made wider than the widest ocean by the strength and skill of the British Navy. It has made all the difference to our island history. The narrowness of these parts of the British Seas brought our ancestors across in the early days of our national history; but, in time, they came to see that while they had used the sea as a bridge they must prevent other nations from doing so if they would dwell in peace and build up a strong nation. And so it came about that the British people worked a miracle; they made a narrow and shallow water-channel wider and deeper than the oceans; they turned a bridge into a wall of defence—all by building and keeping a strong Navy. No one who has lived through the Great War will fail to understand what we mean.

We must not forget, however, that man is master to-day of the air, as well as of the lands and the seas. When the first Zeppelin raided our shores German newspapers came out with screaming headlines—'Britain no longer an island.' And in a sense they were right. We must remember, too, that a big gun can send a shell as easily across Dover Strait as the eye can see the white cliffs of France from Dover cliffs on a clear day.



## *General Survey*

### THE MAP OF THE HOMELAND

Let us now come right home, and look at the map of the British Isles—two large ones and a large number of small ones—about 5,000 in all.

Where are there most small islands? Where least? Find the Orkneys and the Shetlands to the north of Scotland, and remember they are parts of the British Isles. So are the Channel Islands in the far south.

Find the names of the chief seas and channels which separate the islands; and if you have blank outline maps of the British Isles, put down in their proper places the names—North Sea, Dover Straits, English Channel, Bristol Channel, St. George's Channel, Irish Sea, North Channel, The Minch, and Pentland Firth. Name also the four countries, England, Wales, Scotland, and Ireland, which go to make up 'The United Kingdom.' Mark the Isle of Wight, the Isle of Man, and the Scilly Islands. Find out the names of the four biggest islands of Western Scotland, and put them down, too.

Which of the four countries is biggest? England is easily first. Wales, of course, is the smallest. Older children might like to know the actual figures, so that they can represent the countries by a block diagram to scale. Here they are, roughly:—

England	.	.	Nearly	51,000	square miles
Ireland	.	.	Over	32,000	„ „
Scotland	.	.	Nearly	30,000	„ „
Wales	.	.	Nearly	7,500	„ „

Now look at the map scale. Draw the longest line you can in Great Britain, and measure it according to scale (over 600 miles). Do the same for England (420 miles). For Scotland (290 miles). For Ireland (300 miles). Now measure the greatest breadth of each of

## *Geography of the Homeland*

the four countries (England 360, Wales 115, Scotland 175, and Ireland 175 miles). How long would it take you to cycle across each of the countries, supposing you had a good flat road and went at 12 miles an hour without stopping? Suppose you *walked* at three miles per hour?

Look at a map of the British Isles which shows what their surface is like—where the highlands and the lowlands lie. Which country is most mountainous? Which has most plain-land—most land, that is to say, under 600 feet above sea-level? Which country has the highest mountains? Find Ben Nevis, the highest peak in the Homeland. Find the Fen Country around the Wash—the lowest land in Britain.

Generally speaking, we may say that *Wales* has very little plain-country and a great deal of highland; *Scotland* has a rich lowland lying between a highland region on the south and a much higher and much bigger highland region on the north; *England* has plains and low hills in the middle and south-east, and mountains in the north and far south-west; and *Ireland* has one huge plain in the middle which reaches the sea in the gaps between the mountain lands around its coastline. Look at the map again very carefully, and, taking each country in turn, find out which parts are (1) mountainous, (2) hilly, (3) low and flat. Notice the names of the chief mountain regions; find the Pennine and the mountains of Cumberland, the Welsh mountains, the Grampians of Scotland and the Southern Uplands, and the mountains of Kerry, Donegal, and Wicklow, in Ireland. If you have a blank map, put them all in carefully, taking care to shade *all* the mountain land, and not merely printing the name or drawing a 'caterpillar' or a thick black line.

What is the good of all this? It is important that

## *General Survey*

we should know which parts of the Homeland are mountainous, which hilly, and which flat, because the height of land affects the lives of the people who live and work there. In our country, land above 1,000 feet is not of much use to us unless it has rich minerals, or unless it has plenty of streams which are fast enough to give us water-power, or unless it is well forested. We shall find that there are very many more people who live on the flat and hilly lands than on the mountain lands ; it is not only easy to get a living there, because there is so much work of many different kinds to do, but it is much pleasanter and much more comfortable to live there.

Why is the west of the Homeland high and mountainous while the east is low and flat ?

First of all, it was tilted that way when it was first made, so that most of the drainage was from west to east. But there is another and more important reason. The rocks in the west are old and hard ; those in the east are young and soft. Hard rocks resist the weather, the rivers, the wind, and the rain ; soft rocks are much more easily smoothed and rounded and worn away. The hard old rocks of the west stand out as mountains now ; the softer, younger rocks of the east have been worn down into low hills or flat plains. Even in the eastern half of England we shall find, if we examine them closely, that the ridges of hills are formed by layers of harder rocks coming to the surface, and standing out resisting the weather and running water, while the softer parts of the land surface are being worn down.

### RIVERS OF THE HOMELAND

On the map of England several large rivers are marked. Find the Thames, the Severn, the Trent,

## *Geography of the Homeland*

and the Yorkshire Ouse in England. Which is the biggest of the rivers flowing into the Wash? Find out where these rivers rise. Which will be slowest? Why? Notice that all the rivers you have found have large wide mouths—except the big rivers flowing into the Wash.

Look at the map again, and notice the tributaries that feed these rivers; their names do not matter at present. All the land drained by each river and its fan of tributaries is its basin. Which river seems on the map to have the largest basin?

Rivers are very important to man. They give him water to drink, they water his fields and gardens, they supply him with fish, they do his work, they carry his loads, and make a road for him. A fast river will turn water-wheels which can be made to run machinery in factories or mills, or in electrical power-houses, where electricity is made for lighting, for heating, or for driving machinery. A slow river does work of a different kind; if it is deep enough it allows ships, barges, and lighters to come far up into the heart of the country, and so helps to carry man's burdens. It is cheapest, too, to carry goods by water. Because of this, quite unimportant rivers in England have been deepened and straightened, so that traffic can pass along them. A good example of this is the Manchester Ship Canal, which links Manchester by water to Liverpool; it is almost entirely a deepened river channel; it cost millions of pounds to make, but it has been worth while because so much traffic passes along it between Manchester and the sea.

Rivers are Nature's roads from the hills to the sea. We shall understand this better when we come to study man's roads, and when we find that after all man has found it best in most cases to build his roads

## *General Survey*

and railways along the tracks which Nature has marked out for him.

Find the names of the four biggest Scottish rivers. Which of these are likely to be the slowest, and therefore the most useful for carrying? What kind of rivers will be commonest in a mountainous land like Scotland? What sort of work are they best fitted for? There are hundreds of streams in Scotland which could do the work of steam-engines if they were only made to do so. Some of them are more powerful than a hundred thousand horses; they only want harnessing! How can it be done? By making them turn wheels to drive engines to make electricity—and cheap electricity, too, for the power that produces it costs nothing. All this tremendous free power is only running to waste, unless man harnesses the streams and makes them do work for him. In the Lake-District, in the Pennines, and in Wales, free power has been running to waste ever since the dawn of history. Some day we shall make use of it, instead of using up coal to run our machinery.

Now look at Ireland. One great river catches our eye, for it sprawls right across the middle of the map of Ireland; and the great plain that nearly fills the heart of Ireland is its basin. Find the name of the river. It is different from most others we have noticed; it has large lakes in it. They are really widenings-out of the river itself. Is the Shannon swift or slow? How can you tell from the map? There are several smaller Irish rivers. Every coast has its share of river-mouths. But in Great Britain nearly all the most important rivers find their way to the East Coast, because the general slope of the land is that way. Which big rivers in Great Britain have their mouths on the West Coast?



## *Geography of the Homeland*

### RIVERS AS DESTROYERS AND BUILDERS

All these rivers are doing work like the brook you have studied near your home, but on a much larger scale. In the hills they are running swiftly, tearing away the rocks and cutting out deep channels, and sweeping the broken materials down with their strong current; near their mouths, where they are in flat country, the rivers are dropping much of the silt and gravel they have brought down; their current is not swift enough to sweep it onwards. But they still carry a lot down, and spread it on the sea-bed near their mouths, for the sea-currents to wash away. Long ago most of our rivers were much bigger and more powerful than they are to-day; we know this because the lower parts of their basins are thickly spread with the silt the rivers themselves have brought down. Look at the Fens—the lowlands around the Wash. They consist almost entirely of fine silt brought down by the rivers in past ages. This silt is rich and fertile; and when properly drained makes splendid fields and gardens.

The Thames carries a great deal of its silt out to sea, and much of it remains in its estuary, because the currents of the sea are not powerful enough to sweep it all away. The Thames Estuary is full of big sandbanks, and the safe channels between them for big ships must be marked out by a large number of buoys and lightships. These undersea banks form really a submarine delta. (Compare and contrast Nile.)

Other English rivers, the Liverpool Mersey for instance, build up 'bars' at their mouths with the silt they bring down. Now Liverpool is our second greatest port, and it would never do to allow this silt to collect and the bar to grow. So powerful dredgers are kept constantly at work sucking and digging up the silt

## *General Survey*

to keep the water deep. Even then the biggest steamers must choose the time of high tide to cross the bar.

Like the brook, nearly every river is a destroyer and a builder. It tears up and breaks down the rocks in its upper course, only to build up new land lower down. In its middle part both building up and breaking down are going on, just as they are in parts of your brook. The bigger the river the more work it does of both kinds. The great river Rhine tears up tons of rock from the mountains of Switzerland only to drop it again as fine silt at its mouth. Most of Holland is made of this very silt that once existed as hard rock on the slopes of the Alps.

A big river is most beautiful in its upper half, where Nature has almost altogether her own way. It is most ugly, but most useful in its lower portion, where the big ships come up from the sea to unload their cargoes, and where there are docks and warehouses and factories. The Thames is a good example of this in England; the Clyde in Scotland.

Look again at the map. Make a list of the rivers you have learned, and against each river write the names of two big towns that stand on its banks—one near the mouth, the other about half-way along it.

### ROADS AND RAILWAYS

In a land like ours, where so many people live and there is so much business done, the whole country is covered with a network of roads and railways.

If we could see a complete map of our roads, or a complete map of our railways, we should find that there are most roads and railways in the flat country, and fewest in the mountain lands. There are two reasons for this: (1) Most roads and railways are wanted where there are most people, and we have already seen

## *Geography of the Homeland*

that most people live in the flatter regions ; (2) railways and roads are much easier and much cheaper to make in the lowlands than in the highlands.

But here and there we find highland regions between two lowland regions which are very busy and full of big towns, and which must be connected by road and railway in spite of the highlands which lie in the way. Find the Pennines. Here we have a long mountain backbone lying between the busy slopes and plains on the east and the busy slopes and plains on the west. Roads and railways have had to be carried across them—not by the shortest, but by the easiest way. Engineers avoid steep slopes in making roads and railways, because traffic cannot manage such slopes easily. They seek for natural breaks or gaps in the highlands, or for low passes over which to make a way. If a pass is rather high and steep, the road or railway climbs it in wide zigzags to make the slope easy. In our own land we have no very high passes, for our mountains are not big ones ; but in Switzerland there are many passes higher even than Ben Nevis, our highest mountain ; yet the clever road-builders and railway engineers of Switzerland have overcome the difficulty by making wide zigzags and ‘ hairpin bends,’ which gradually lead to the top.

Look at a large-scale map of the Fen District, and notice how roads are practically straight everywhere. Now look at a similar map of part of Wales, or of the Lake District, or of the Scottish Highlands, and see how roads wind in and out following the valleys. The railways, also, choose the easiest way. But in our country railways are straighter than roads, because it pays railway engineers to make cuttings through low hills and short tunnels through high ones. Where in the Homeland are railways likely to have most long tunnels ?

## *General Survey*

We shall find nearly always that when we are studying the railways of a country that in the mountainous and hilly parts the railways follow the river valleys. So do the chief roads. The river has cut a way ages ago for man. Long before the coming of the first men rivers were hard at work channelling and cutting out valleys, which ages afterwards became the ways followed by men in moving from one place to another. Almost any good photograph of a big valley in the Homeland will show a road running along its bottom, and perhaps a railway as well. A good large-scale map of the valley made by the Aire tributary of the Yorkshire Ouse will show not only roads and railways using the valley to get across the Pennines but a canal as well.

### CANALS

Canals, too, wind about a great deal, like the roads. For in making a canal engineers try to keep as far as they can at the same level. Many canals form a sort of contour line for much of their length, winding about, as they do, keeping to the same height above sea level.

Canals can be carried across a gorge or valley just as a road or a railway may be. A big steel trough is laid across the gap, forming a sort of bridge over which the canal passes. Canals are also carried through tunnels, and even over low hills.

How is a canal carried over a hill? By means of locks, which rise like a huge flight of steps one above another. (Explain locks.) There is a good example of this near Devizes, in Wiltshire, where the Kennet and Avon Canal is carried up to the level of the high Vale of Pewsey. A short flight of locks leads down again to the valley of the Bristol Avon.

In this country we do not use our canals so much

## *Geography of the Homeland*

as we might. Many of them have been allowed to become choked with weeds, their locks have fallen into decay, and no traffic passes along them. This is partly because our canals are of different widths, so that very long journeys on them are possible only for small canal boats, and partly because the railways have stolen their traffic. On the Continent much more use is made of the canals ; they help to feed and relieve the railways instead of competing with them, and so form a very important part of the communication system of the country.



## CLIMATE

WE British have the good fortune to live in a country which is not only rich in coal and iron, which is not only fertile and beautiful, but which is neither too hot nor too cold for good, hard, honest work. That is to say, we have a temperate climate of the best kind.

Look at the globe again. Find out how far Britain is from the Equator. Now find other countries which are in the same zone about the same distance away. Russia is one; Canada is another. We know what a Russian winter is like; and we have heard how in the winter most Russian ports are blocked by ice. Canada's great river St. Lawrence is sealed by the winter ice for at least three months in the year, and yet it is even nearer the Equator than Britain. There is no port in Britain which is ever frozen up in winter. There is no spot in the British Isles where we can stand, as we might on the coast of Labrador or Newfoundland, and watch the big icebergs sailing by in the spring of the year.

It is clear that these islands of ours have special advantages over other countries which are in the same zone at about the same distance from the Equator. Our Homeland is much warmer in winter and much cooler in summer than these other countries.

What are these advantages?

### AN ISLAND CLIMATE

First let us be clear what we mean when we speak of the 'climate' of any region. Climate is the average weather of a region. We may speak of the *weather* of a day, or a week, or even of a year. But when we speak of the kind of weather which is the general rule throughout the year in any region, we are referring to its climate.

## Geography of the Homeland

The climate of the Homeland is warmer in winter and cooler in summer than that of most countries in the same latitude for two chief reasons : (1) The Homeland is a group of islands ; (2) that group of islands happens to be on the eastern side of the Atlantic ocean.

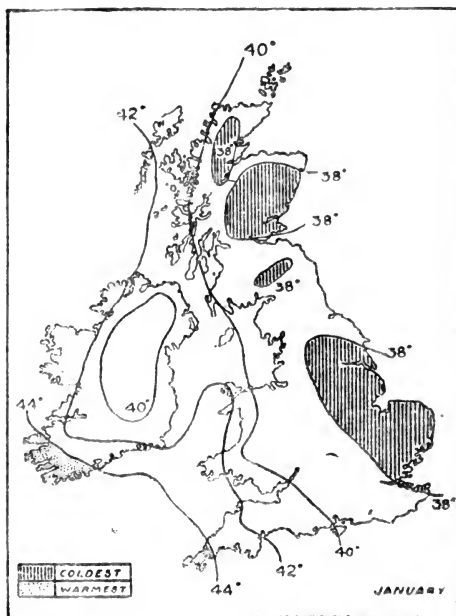


FIG. 1.—JANUARY TEMPERATURES

All small islands and the coastlands of very big ones have an island climate (insular)—a climate which is not so hot in summer and not so cold in winter as would be the case if they were *not* islands. This is because the sea is warmer than the land in winter and cooler than the land in summer ; for the winds that blow from the sea will bring cool airs in summer and warmth in winter.

## Climate

But our islands are much warmer than they would be if they were on the other side of the Atlantic. Think of the Newfoundlanders, whose ports are frozen up every year! And they are no farther from the

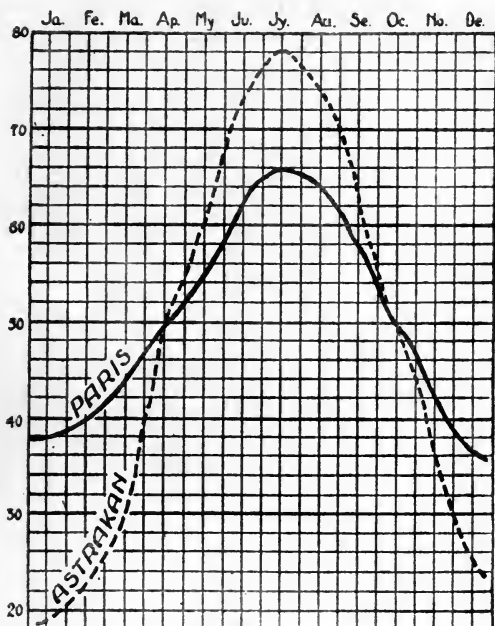


FIG. 2.—TEMPERATURE CURVES

Equator than we are—nearer, in fact, if anything. Why is it? It is because the eastern side of the Atlantic Ocean is warmer than the western side, where Newfoundland lies. There is a steady drift of warm water from the tropical Atlantic towards Western Europe, and this is pushed on by the westerly winds which blow on an average three days out of every five in our latitudes.

# *Geography of the Homeland*

## THE IMPORTANCE OF WINDS

The direction of the wind makes a great deal of difference to us all, especially in winter. Imagine how we feel when we get a stinging 'North-easter' after a week or two of warm south-westerly winds.

It is fortunate for us that the winds we get blow

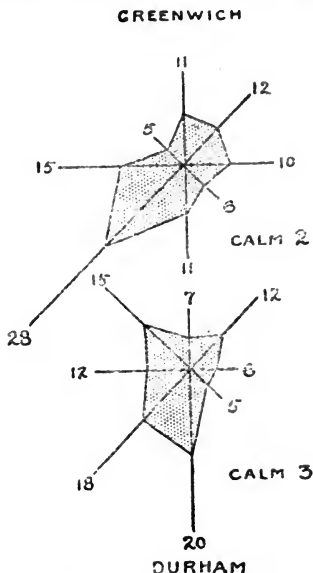


FIG. 8.—WIND-ROSES

oftenest from the westward—they are west, or south-west, or north-west winds. We can prove this by keeping records every day for the year, as is done in many schools. (Seniors can record wind-direction by making 'wind-roses,' as illustrated on this page; juniors can do so by filling up one of the many excellent forms issued for this purpose by well-known map-publishers.)

## *Climate*

These 'Westerlies' bring to the Homeland warmth from the warm ocean in winter and cool air from the sea in summer (for then the land is much hotter than the sea). They bring also rain, which is of very great importance to a country. What differences should

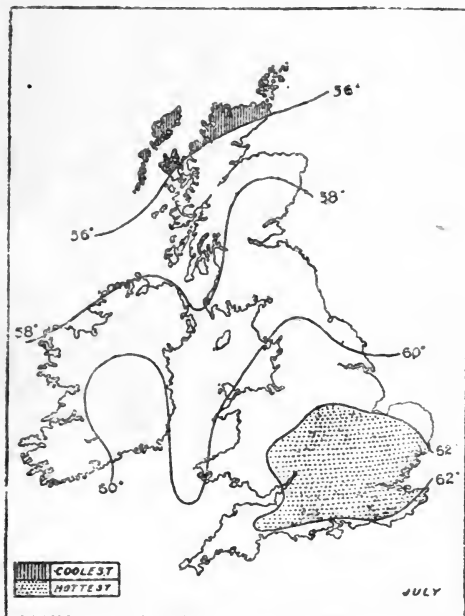


FIG. 4.—JULY TEMPERATURES

we discover in our climate if the 'Westerlies' gave up their old habit of blowing oftenest, and we had easterly winds instead? Again, suppose that instead of the Atlantic Ocean a great continent lay to the westward of our islands? What difference would that make? The Westerlies bring continental influences to Newfoundland; but they bring oceanic influences to

## *Geography of the Homeland*

Britain, because our islands happen to be on the opposite side of the Atlantic.

### CLIMATIC DIFFERENCES WITHIN THE HOMELAND

(Figs. 1 and 4 bring out the chief differences in the local climates of the Homeland. Seniors will, of course, be referred to the full isothermal charts; juniors will have their attention directed to the shading only on each diagram. We deal with the latter first.)

Fig. 1 shows us which parts of the Homeland are coldest in winter. Notice that they are on the *eastern* side of Britain, nearest the Continent and farthest from the Atlantic. Is it what we expect? Again, find where it is warmest in Britain during winter. Why this part?

Now look at the summer map. Where is it hottest? Where coolest? What are the reasons? Notice that in England it is hottest in summer where it is coldest in winter! Notice, too, that it is coolest in summer where it is warmest in winter? There is not a very great deal of difference in these climates in a small country like ours; but there is enough to make people glad to leave London and the East of England and go to spend the winter in Cornwall.

Seniors will notice that the trend of the January isotherms is, generally speaking, at right angles to that of the July isotherms. In January the warm influence lies to the south-west and the cold one to the north-east; but in July the warm influence lies to the south-east and the cool one to the north-west.

They will notice, too: (1) That the north-west of Scotland is as warm as the Isle of Wight in January; (2) the peculiar bends of the isotherms over St. George's Channel—equatorwards in July; polewards in January—indicating very clearly the difference in temperature

## *Climate*

between land and water in the same latitude ; (3) that the Irish Plain back of Dublin has the most extreme climate in Ireland, and that the south-western coastland is mildest.

### WORK FOR SENIORS

Seniors should be supplied with the mean monthly temperatures of selected places, in order that they may compare and contrast by actual figures, and perhaps draw temperature graphs of good contrasts as in Fig. 2. Valentia, on the mild south-west coast of Ireland, has a much less range of temperature than London, which is situated on the eastern and leeward side of Britain.

Simple diagrams illustrating 'range of temperature'—the difference between the mean temperature for the hottest month and that for the coldest month—can also be drawn. In any case, they should be expressed as a figure for each of the given places, and the figure should be put in brackets after the name of the place where it is marked on the map. Thus : Aberdeen (19 deg. F.)—the difference in degrees between the January and the July mean temperatures.

PLACE.	MEAN TEMPERATURE (F.°)											
	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Sumburgh Head (Shetlands) . .	39	38	38	41	45	49	53	53	50	46	42	40
Stornoway . . . .	39	39	40	43	47	52	54	54	51	46	42	39
Fort William . . .	39	39	40	45	50	55	57	57	53	47	44	40
Aberdeen . . . .	38	38	40	44	48	54	57	56	53	47	42	38
Glasgow . . . . .	38	39	40	45	50	55	57	57	53	47	42	39
Londonderry . . .	40	41	42	46	51	57	58	58	55	48	44	41
Seathwaite . . . .	38	38	39	45	50	56	58	57	54	47	43	39
North Shields . .	39	39	40	44	48	54	58	58	54	48	43	39
Valencia . . . . .	45	45	45	48	52	57	58	59	56	51	48	46
Dublin . . . . .	42	43	43	47	52	58	60	59	56	49	45	42
Rugby . . . . .	37	38	41	45	51	57	60	59	55	47	43	38
Yarmouth . . . .	37	38	40	44	50	56	58	60	57	49	44	39
Falmouth . . . .	43	44	44	48	52	57	60	60	57	52	48	45
Ventnor . . . . .	41	42	44	48	53	59	61	62	59	53	48	43
London (Greenwich) . . .	38	39	42	47	53	60	63	62	57	50	43	49

## BRITISH RAINFALL

THE Homeland rarely suffers from drought. Our air is nearly always moist, and rain is frequent. Rain may occur on any day in the year; but, as a rule, most rain falls in autumn and winter, as may be verified from the rainfall figures given on page 26.

The two main causes of our abundant rainfall are :—

(1) The presence of a great warm ocean to the west of our islands; (2) the fact that the winds which blow oftenest in this country are the 'Westerlies' (which include South-Westerlies and North-Westerlies). These winds bring plenty of moisture from the warm North Atlantic.

### THE RAINFALL MAP AND THE RELIEF MAP

If we place side by side (1) the relief map of the British Isles (a contoured map will do as well), and (2) the map which shows the average rainfall for the year (Mean Annual Rainfall), we shall notice some remarkable correspondences.

The fact that stands out most strongly is that we have most rain in those regions which are most mountainous, and least rain where the land is flattest. In fact, we could almost use the mean annual rainfall map as a map of the surface relief of the country. Evidently there is a very close connexion between rainfall and relief.

[A very useful exercise for seniors is to draw a section across the contours of Britain, say, in the latitude of the Lake District, or of mid-Wales; and then to draw a rainfall curve to show how the rainfall varies from point to point along the line of section, using the annual rainfall figures for the places they select. The profile of the section and the rainfall curve will show marked resemblances.]



## *British Rainfall*

The wettest parts of the Homeland are the highland regions of the West—Cornwall and Devon; Wales; the Lake District; the Western Highlands of Scotland; and the South-West of Ireland. The driest regions are on the Eastern side of Great Britain and Ireland; the driest area of all being South-East England. What would be the effect if the prevailing winds came from the East instead of from the West? Eastern slopes would be wetter than Western slopes; and the annual rainfall would be much less than it is at present, because the winds would be continental winds, bringing merely the moisture gained by the crossing of the small North Sea.

Why is it important to know something about the amount of rain that falls in different parts of the country? The amount of rain, and the time at which it chiefly falls, govern the character of the vegetation. Crops which require much rain differ considerably from those which need little. The South-East of Britain, for example, is our chief wheat-land, because it has less rain than other parts of the country; farmers can depend better upon the drier late summers and early autumns for the ripening and harvesting of the grain. We shall return to this later.

### WHY IT RAINS

All air contains more or less moisture invisibly. The warmer the air, the more invisible moisture it can hold. If anything happens to cause a sudden drop in the temperature of an air current, the air loses its ability to hold so much invisible moisture, and has to part with some of it—perhaps as rain, perhaps only as fog or mist. In other words, a sudden drop in temperature usually results in condensation of moisture.

## *Geography of the Homeland*

The chief way in which air currents are suddenly cooled is by their being forced to ascend rapidly to higher regions of the atmosphere, where the air is much rarer. Air which suddenly ascends in this way passes rapidly from a region of dense atmosphere to a region of much rarer atmosphere. It expands rapidly, and is cooled in the process. This cooling

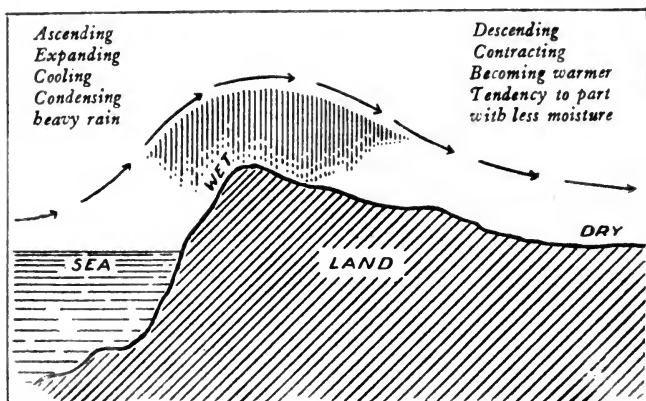


FIG. 5.—AIR CURRENT PASSING FROM SEA TO LAND

robs it of its power to hold so much invisible moisture, some of which becomes visible as fog or cloud or rain. The processes are: (1) ascension; (2) expansion; (3) cooling; (4) condensation. It is the expansion which is the chief cause of the cooling.

Fig. 5 shows how a mountain barrier deflects moist air currents upwards, and causes rainfall. It also shows what happens on the other side of the barrier, where the air is descending and becoming warmer by compression, and, therefore, losing its tendency to part with its invisible moisture. This explains why eastern slopes in the Homeland are much drier

## *British Rainfall*

than westward slopes. Westward slopes face the warm, moist winds from the North Atlantic Drift (*not* the Gulf Stream). A good example to illustrate Fig. 5 is that of the contrast between Seathwaite and

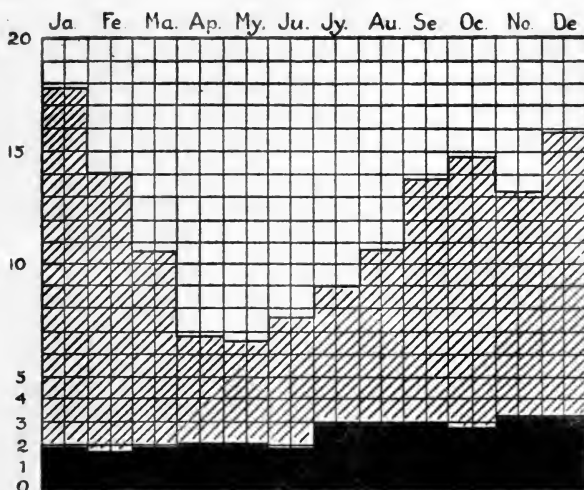


FIG. 6.—RAINFALL AT SEATHWAITE AND SEAHAM

Seaham, whose rainfall figures are given in the table below.

Other causes which produce ascending air currents, and so bring about condensation, are : (1) The uprush of air in a cyclonic disturbance ; (2) the summer heating of big land surfaces, which causes the conventional rains of continental interiors, and consequently summer rains ; (3) the presence of a ' bank ' of cold, dense air, over which a warm current is forced to ascend. One or other of these causes will explain the fairly heavy rainfall which flat countries like Belgium and Holland get.

# Geography of the Homeland

## RAIN AND THE SEASONS

Brief study of the rainfall figures below makes it clear that, although the Homeland has rain all the year round, most rain falls in autumn and winter.

British rainfall records show that, on the whole, spring is the driest season throughout the Homeland, and that autumn is wettest. In spring the land is a little warmer than the sea, and condensation is not so great as in winter, when warm air currents from the North Atlantic are rapidly cooled by the much colder land. In South-East England, however, we have an exception; the heaviest rain falls in July, on account of the frequent thunderstorms in that month. The centre of England, too, has a tendency to rainfall of the Continental summer type, as may be seen from the table below.

PLACE.	MEAN MONTHLY RAINFALL. (Inches.) [Based on Meteorological Office Records.]											
	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Pomona. . . . .	3.5	3.3	2.8	2.2	1.7	1.9	2.5	2.8	3.7	4.4	4.6	4.4
Portree . . . . .	10.3	7.4	5.8	4.3	3.8	4.8	5.1	5.5	7.5	9.2	8.3	9.9
Inverness . . . . .	2.3	1.5	1.6	1.5	1.6	1.9	2.7	2.8	2.8	2.4	2.5	2.1
Glasgow . . . . .	4.8	3.8	2.6	2.4	2.2	3.1	3.5	4.0	4.3	4.3	3.6	4.5
Edinburgh . . . . .	2.5	2.2	1.6	2.0	1.9	2.1	2.8	3.1	2.9	2.2	2.5	2.4
Omagh . . . . .	3.7	2.4	2.3	2.2	2.2	2.7	3.3	3.5	3.7	3.9	3.3	3.5
Belfast . . . . .	3.3	2.7	2.1	2.0	2.2	2.2	3.0	3.1	3.3	3.8	3.0	3.1
Dublin . . . . .	2.2	1.9	2.0	1.8	1.9	2.1	2.8	3.3	2.2	2.8	2.8	2.3
Liverpool . . . . .	2.1	1.7	1.8	1.7	2.0	2.2	2.7	3.1	2.5	3.3	2.6	2.6
Seathwaite . . . . .	17.6	14.1	10.5	6.8	6.5	7.2	8.8	10.6	13.7	14.7	13.3	15.8
Seaham . . . . .	1.8	1.6	1.7	2.0	2.0	1.9	2.8	2.7	2.8	2.6	3.1	3.1
Cork . . . . .	5.1	3.9	2.9	2.8	2.4	2.9	2.4	3.2	3.7	3.8	3.9	4.3
London . . . . .	2.5	1.8	1.6	1.9	1.9	2.5	2.4	2.4	2.7	2.7	2.1	2.5
Birmingham . . . . .	2.8	2.3	2.1	2.2	2.5	2.7	3.0	3.2	3.6	3.4	2.4	2.7
Lowestoft . . . . .	1.8	1.8	1.7	1.7	1.8	1.6	2.7	2.2	2.7	2.1	3.0	2.6
Penzance . . . . .	5.8	4.1	3.0	2.8	2.1	2.0	2.7	3.2	3.8	5.1	4.9	5.4

## CLOUD AND SUNSHINE

The Homeland lies in a part of the world that is almost the cloudiest region in the world. The air is almost always moist, and any little sudden drop of

## *British Rainfall*

temperature produces mist or cloud either on the land or in the air. Even when we have no rain, our skies are hidden by grey cloud-belts for days together.

The sunniest parts of the Homeland are the south and east coastal regions, which get, on the average, from 1,600 to 1,800 hours of sunshine every year. The cloudiest regions are the Pennines and Scotland (except the coast lands), which have less than 1,200 hours of bright sun every year. In Ireland it is the north-eastern quarter which has least sunshine (less than 1,300 hours yearly), while the south and east have most (from 1,500 to 1,600 hours yearly).

### RAINFALL DIAGRAMS

Fig. 6 is a typical rainfall diagram. It explains itself. Seniors can draw others on the same plan, using the table of mean monthly rainfall figures given below. They should also draw temperature graphs for the same places if possible.

# PLOUGHLAND AND PASTURE

OUR mild, moist climate enables us to grow many of the most valuable food plants, and to rear those animals which are most useful to man.

## PLANT LIFE AND HEIGHT OF LAND

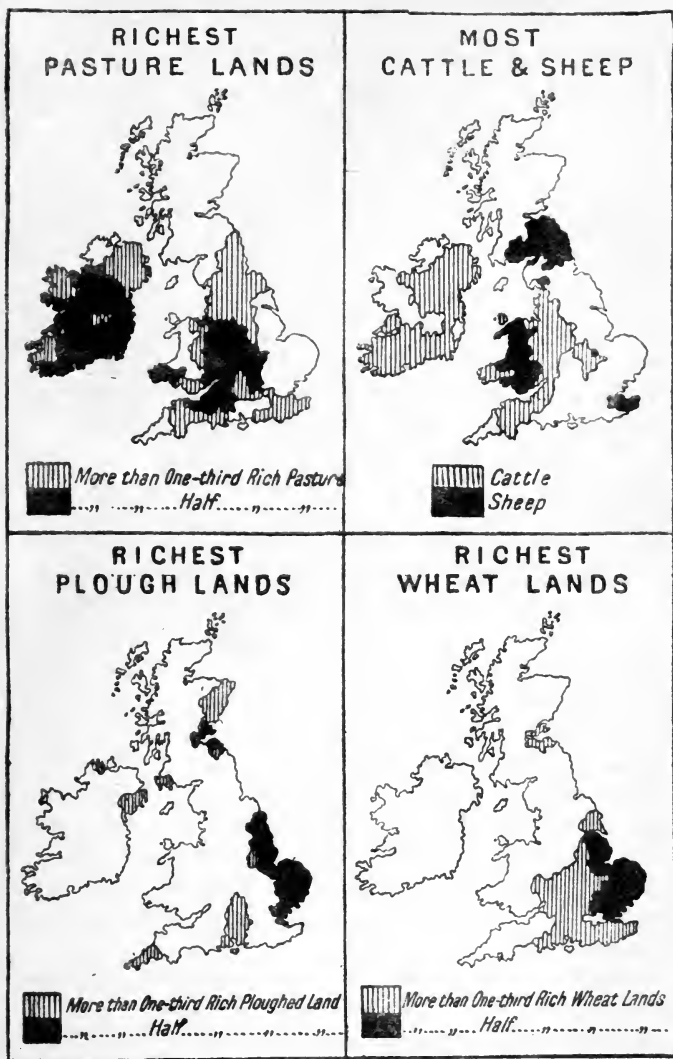
We cannot use all our land, though in this country we can find a use for a great deal of it. Land which is high and steep is barren because there is little soil upon it, and because it is too wet and cold. Land which is flat and sunny is fertile, and can easily be ploughed and planted, tended and harvested.

The diagram on page 29 shows where our richest ploughlands lie. Notice where they are, and then look at a map showing the highland regions. What stands out clearly is that the best ploughland is in the lowlands of the south-east of Britain. Now look at the diagram of rich pasture. The richest is again in flat or fairly flat country ; but there are some regions where pasture of excellent quality lies upon the lower hillslopes.

Now look at the rainfall map, and compare it with the contour map. The wettest regions are the highland regions of the western side of the Homeland. The drier regions are the warm sunny lowlands where the best ploughlands lie. A great deal of the rich pastureland is in regions where the rainfall is not too heavy and not too light.

## ANIMALS AND THE GRASSLANDS

Our chief animals are horses, cattle, sheep, and pigs, most of which are reared upon the rich pasture lands shown in our diagram. Look at the diagram showing where most sheep and cattle are reared. Sheep are most common on hillslopes that are fairly dry, and



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FIG. 7.—PLOUGHLAND AND PASTURE

## *Geography of the Homeland*

covered with short crisp grass. Cattle are most numerous on richer, wetter slopes and meadow lands.

Why is this? Cattle must have water; sheep can do with very little. Again, damp lands are not good for sheep; nor are very dry lands for cattle. Sheep have small mouths, and can crop shorter grass than cattle, which prefer richer and more luscious feed.

*Sheep*, therefore, are reared chiefly on the poorer grasslands of the chalk hills of South-East England, and the long line of freestone hills behind them westward—the Cotwolds, Edge Hills, Northampton Heights, Lincoln Edge, and the North York moors; while cattle are reared in the clay valleys between these great ridges. Sheep are also reared on the Southern Uplands of Scotland, on the Cheviots, and on the drier slopes of the Welsh mountains.

*Cattle* are chiefly reared on the rich pastures of the Midlands, of Cheshire and Lancashire; of Wales, Devon, Somerset; and in the Irish Plain. Every one has heard of Cheddar cheese, of Cheshire cheese, and of Caerphilly cheese; of Devonshire junket and Devonshire cream; of Welsh and Irish butter. The names tell their own story. Some boys and girls who know something about farming may call to mind the most famous breeds of cattle, *e.g.* Herefords and Devons, famous for their beef; Ayrshires and Jerseys, famous as milkers; and so forth. Look these counties out on the map, and notice how they lie in regard to the rich pasture-lands.

Height of land, then, and rainfall decide what sort of pasture there is in a region; and the kind of pasture decides whether cattle or sheep or horses shall be reared.



## *Ploughland and Pasture*

### HORSES AND PIGS

Horses vary in build and size, according to the region in which their stock is chiefly bred. Suffolks, Yorkshires, and Clydesdales are those great, strong horses used for heavy work. Contrast these with the wiry moorland and mountain ponies of Wales, Scotland, and the Shetlands. The chief horse-rearing lands are drier pasture, and have plenty of oats rather than wheat growing on the ploughlands close by.

Pigs thrive upon the waste of dairy farms, and so are usually greatest in number in the dairy-cattle regions ; but they are largely fed, too, upon potatoes, and so potato counties like Cambridgeshire, Lincolnshire, Lancashire, Durham, and the potato country of Ireland are all famous for their pigs. Famous breeds of pigs are the big Yorkshires, Berkshires, Ulsters, Lincolns, Devons, and Suffolks ; all named after the region in which they are reared in finest perfection

Here again we find that the rearing of horses and pigs depends upon the pastures, which depend upon the climate and the height of land.

The introduction and cultivation of root crops have done a great deal to make our stock-rearing a success. Our Saxon and Norman forefathers could not keep many cattle, sheep, and pigs all the winter ; grass was poor and food was too scarce. So they had to kill a large number and salt them down. This meant that they had to eat great quantities of salt meat, which was not good for their health. But to-day great crops of juicy turnips, mangolds, swedes, carrots, and other roots are grown in the moister, wetter ploughlands ; potatoes, unknown in Saxon and Norman times, are raised in millions of bushels. So plenty of food is

## *Geography of the Homeland*

provided for our farm animals, which can be fed and even fattened for market during the winter. Great quantities of oil cake and other foreign cattle foods are brought, too, from other countries.

Besides grass and hay, farmers on the lowlands grow huge crops of vetches, clover, sainfoin, and lucerne, which can not only be eaten green, but can be stored and eaten dry like hay.

### THE GRAINLANDS

Our diagram (Fig. 7) shows which parts of the Homeland grow most wheat—the most important of all the grains or cereals. Notice, that if you draw a line, say, from the Tees to the Severn mouth, all the best wheatland lies to the south-east of this line, except that of the eastern part of the Scottish lowlands.

Examine this area (1) on the contour map ; (2) on the climate and rainfall maps we studied last lesson. What conclusions must we come to ?

The wheatlands occupy the best of the richest ploughlands. They lie where the land is fairly level, and where summers are longest and driest and sunniest. The soil is heavy and rich ; the rain falls just when it is needed to swell the young ears of wheat, and the hot sun of late summer ripens the grain for its harvesting in the dry early autumn.

Oats will stand the cold and the damp much better than wheat. So will barley—and more so. As a result we find (1) that oats and barley are grown almost everywhere in the Homeland where there is ploughland ; (2) that oats and barley grow far north in Scotland, and in Ireland, too, where wheat would not do at all.

## *Ploughland and Pasture*

Seniors might like to examine the following figures for 1916 :—

Country.	100,000 Quarters of		
	Wheat.	Barley.	Oats.
England and Wales. . . . .	69	52	104
Scotland . . . . .	3	6	45
Ireland . . . . .	2	7	63

We think of Scotland as the land of oats ; but England and Wales produce more than twice as much ! Of course, we have to consider this result in relation to the available ploughland in the various countries. Scotland has much less than England and Wales. Look at the contour map for the reason.

The following table helps us to understand and explain the figures in the table above :—

Country.	100,000 Acres.	
	Total Area.	Ploughland Area.
England . . . . .	324	103
Wales . . . . .	47	7
Scotland . . . . .	190	33
Ireland . . . . .	202	50

It will be interesting for seniors to account as fully as they can for the figures in both tables.

# THE HARVEST OF THE SEA

A LARGE number of workers are engaged in reaping the harvest of the sea—in bringing to the fish-markets of the Homeland the hundreds of thousands of tons of fish caught in British seas every year. It is a harvest which needs no ploughing and sowing, and it is carried on all the year round. Our fisheries are a most important source of food supply ; and changes due to the war have made them more important to us than ever.

## BRITISH FISHERIES

The British Isles have the second greatest fishing industry in the world ; they are second in importance only to the United States.

It is fortunate for us that the seas of the Homeland are warm and shallow, for in such waters fish are most abundant, especially if they are partly enclosed and yet have plenty of current movement in the water. These currents bring down the eggs and young of the food fishes ; and the sand banks over which the water is shallow are splendid feeding-grounds for fish, for they provide shelter for multitudes of tiny creatures upon which the fish feed.

Everywhere around our coasts where there are fishing villages, hardy fishermen are at work all the year round catching fish for themselves and for the people in the neighbouring towns. But these fishermen are not the men who bring in the great bulk of the food fishes which supply the dense population of our great manufacturing districts. It is not the 'longshoreman,' but the 'deep sea fisherman' who is responsible for the most important share in the harvest of the sea.

The chief fishing grounds of the deep-sea fishermen of the Homeland, in order of importance, are :—

## *The Harvest of the Sea*



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FIG. 8.—NORTH SEA FISHERIES AND PORTS

## *Geography of the Homeland*

(1) The North Sea, (2) The Iceland Seas, (3) Seas around the Faroe Islands, (4) South of Ireland, (5) West of Scotland, (6) St. George's Channel, (7) Norwegian Seas, (8) English Channel, (9) West of Ireland, (10) White Sea, (11) Bristol Channel, (12) North of Scotland.

At first it is a little surprising to find the White Sea and the Iceland Seas in a list of British fisheries. But our fishermen not only go as far north in search of their harvest; they go far south as well, to the distant waters of the Bay of Biscay, Portugal, and Morocco.

### FISHING PORTS

In order to handle the vast quantities of fish brought every year to the Homeland, the men at our great fishing ports are kept very busy. Millions of hundred-weights of fish have to be landed, counted, sold, and sent by rail, road, and water to the thickly populated districts which need them most, and can pay best prices for them.

A fishing port of any importance must not only have a good harbour, fine docks, plenty of warehouse and storage room, and a fish-market; it must also have good railway connexion with the big towns, so that the fish may be quickly sent to where they are needed. Fish are best when they are fresh; so the quicker they reach the people who are going to buy them to eat the better. For the same reason the fishing-boats must be swift as well as seaworthy; and they must be provided either with 'wells,' in which the fish can be kept alive, or with ice in which fish can be packed to keep them fresh, if they are caught a long distance from port.

The fishing industry of the Homeland is mainly carried on at a few big ports where there are fine

## *The Harvest of the Sea*

fish-docks, and good railway accommodation. The chief fishing ports of the British Isles, in order of importance, are Grimsby, Hull, London, Lowestoft, Yarmouth, Fleetwood, Milford, North Shields, and Aberdeen. Notice that only two of these, Fleetwood in Lancashire, and Milford in Pembrokeshire, are on the west coast. All the rest are on the east coast of Britain. This is chiefly because the most important of all our fishing grounds is the North Sea.

### THE NORTH SEA

Fig. 8 shows the fishing grounds of the North Sea, and the chief fishing ports from which fishermen set out to reap its abundant harvest.

The North Sea in 1910 yielded nearly half of our supply of fish ; no other fishing ground is anything like as rich. Its warm shallow waters, its moving currents, and its many sandbanks, make it a perfect fishing ground. If St. Paul's Cathedral were set down in almost any part of the North Sea, the dome would stand above water. It is only near the coast of Norway that the North Sea is very deep.

The leading ports, Grimsby and Hull, lie directly opposite and very near the Dogger Bank, which is the most famous of all our home fishing grounds. The water over the Dogger Bank is ten fathoms deep (60 feet), where it is shallowed ; so there is never any danger of ships running ashore upon it ! From our east coast fishing ports great fleets of steam and motor-driven fishing vessels go out to ' the Dogger ' to catch the fish that swarm in the waters over it. Swift fish-carriers go to and fro every day between the fishing fleet and the fishing ports ; and from the latter fast fish-trains distribute the catch over the busy manufacturing and business areas of England.

## *Geography of the Homeland*

Aberdeen and north of Scotland fishermen fish the 'Long Forties,' and the 'Great Fisher Bank,' and also take a prominent share in the Iceland, Faroe, and Norwegian fisheries.

The chief fish caught in the North Sea are haddock, cod, plaice, and whiting. Turbot, brill, and soles are also caught in fairly large quantities. Haddock are so abundant that they form nearly half of the total weight of fish caught ; next come cod.

The great London fish-market of Billingsgate takes toll not only of the Dogger, but also of the fishing-grounds farther south. Lowestoft and Yarmouth are famous for the huge catches of herrings and sprats brought to their harbours when these fish are plentiful off our East Coast.

### HOW THE FISH ARE CAUGHT

Fish like cod, hake, haddock, halibut, skate, plaice, and soles are known as 'bottom fish,' because they get their food on the bottom of the sea, or near it. Such fish are caught by steam trawlers, or by steam 'liners.' The trawler drags a huge bag-like net along the bottom to catch plaice, turbot, brill, and perhaps cod and whiting as well. The 'liner' uses long fishing lines with thousands of hooks on them. The lines are baited and 'shot,' or laid, and left for a time. After a while the lines are hauled and the fish, chiefly haddock, cod, and halibut, are taken off.

Fish like herrings, sprats, mackerel, and pilchards are known as 'surface fish,' because they feed near the surface. They swim all round our islands in big shoals, and are caught by steam 'drifters'—vessels which make their catch by means of long drift-nets. The top of the drift-net is kept at the surface by corks ; its bottom, weighted with leaded ropes, is from twenty



## *The Harvest of the Sea*

to thirty feet below. The drifter finds out where there is a big shoal of fish, and shoots her nets around the shoal, enclosing it in a sort of wall of netting which may be over two miles long.

Lowestoft and Yarmouth are famous for herrings and sprats ; as we have said ; but the great pilchard fishery is off the coast of Cornwall. Mackerel, like herrings, sprats, and pilchards, are migrating fish, and appear in shoals off Cornwall in January, off Sussex in March, and off East Anglia in May.

### FISHERY INDUSTRIES

Besides the actual business of catching and marketing the fish, there are other kinds of work which are kept going by our fisheries.

Millions of herrings are salted down in barrels for export to Russia or to Mediterranean lands ; hundreds of thousands of others are made into bloaters or kippers. Haddock and cod, too, are ‘kippered,’ or split open, salted and dried. Other kinds of fish—lobsters and crabs, for example—are canned ; others—shrimps for instance—are made into fish-paste and other preparations.

Nor must we forget the tens of thousands of fried-fish shops in the big towns all over the country, which before the war cooked and sold nearly 20 per cent. of all the fish eaten in the United Kingdom.

## BRITISH COALFIELDS

**P**ERHAPS Nature's richest gift to the Homeland is the vast store of coal and iron which is the real secret of our national wealth and our enormous trade. The rocks of Britain are rich in both these valuable minerals, which are indispensable to a manufacturing nation.

Coal means not only heat and light. It means *power*. Coal feeds the furnaces which heat boilers and produce steam. The steam may be used directly to drive the machinery in our factories, to run our trains and steamers, or to drive the dynamos which produce electricity—another great source of power, which is every day coming more generally into use. Behind electricity and behind steam there is coal. So that coal is absolutely necessary to our lives and our fortunes. True, electricity may be generated by water-power; but though we have plenty of water-power in this country, it is comparatively little used. Coal is the real secret of our great industrial wealth, and it lies at the root of our success in world trade.

### BRITISH COALFIELDS

The map on page 41 shows the chief British coalfields. (See numbers in parentheses.)

They fall into the following groups :—

#### I. *The Scottish Coalfields.* (1-3).

These lie in the Scottish Lowlands, or, as senior pupils will call it, the Scottish Rift Valley, where they lay protected by overlying sediments when the rest of the coal-measures of Scotland were planed off through long ages of denudation. They are :—

- (a) The Coalfields of Fife and the Firth of Forth.
- (b) The Lanarkshire Coalfield.
- (c) The Ayrshire Coalfield.

## *British Coalfields*

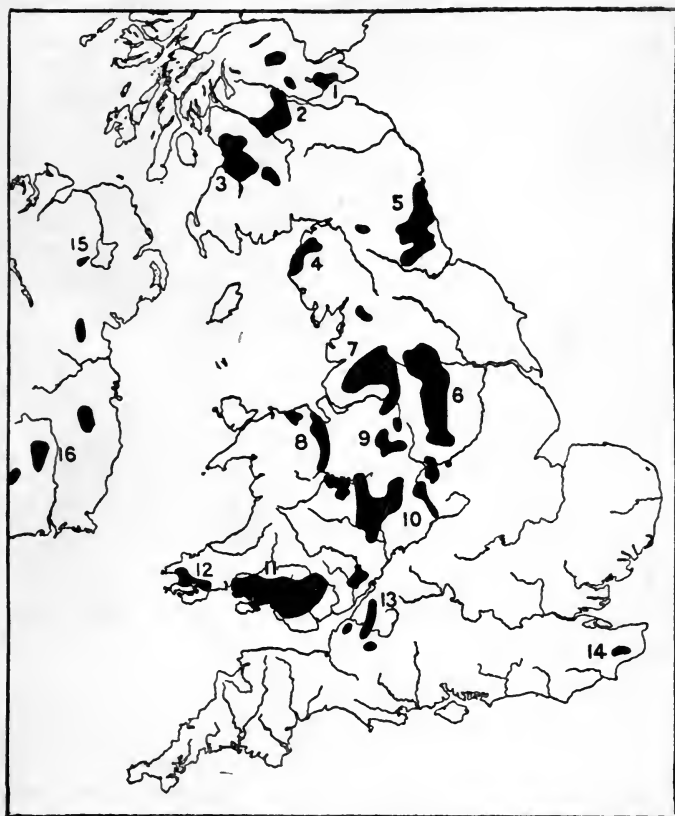


FIG. 9.—BRITISH COALFIELDS

## *Geography of the Homeland*

### *II. Coalfields Around the Pennine System. (4, 5, 6, 7, 9, and 10.)*

These lie around the flanks of the Pennines, and include all the following :—

- (a) The Northumberland-Durham Coalfield.
- (b) The Yorks, Notts, Leicester, Derby Coalfield.
- (c) The North Staffordshire Coalfield.
- (d) The South Staffordshire Coalfield.
- (e) The Warwickshire Coalfield.
- (f) The South Lancashire Coalfield.
- (g) The Cumberland Coalfield.

### *III. Coalfields of the Welsh Border. (8, 11, 12.)*

- (a) Flint Coalfield.
- (b) Mid-Severn Coalfields.
- (c) Forest of Dean Coalfield.
- (d) The South Wales Coalfield.
- (e) Pembroke Coalfield.

### *IV. The Bristol Coalfield. (13.)*

V. *The Kent Coalfield*—the newest of all. Here the coal lies at great depths, and costs a great deal to get. (14.)

### *VI. The Irish Coalfields. (15 and 16.)*

Ireland is very poor in coal. This is one reason why Ireland is a much poorer country than any other in the British Isles. The coal was there ages and ages ago, but it was nearly all planed off by the great weather-forces which do so much to carve and mould land surfaces. Only two fields of any importance remain :—

- (a) The Dungannon Coalfield.
- (b) The Kilkenny Coalfield.

# *British Coalfields*

## BRITAIN'S ADVANTAGES

Britain is not only one of the largest coal-producers in the world, but she enjoys special advantages which do not fall to the lot of every coal-producing nation.

(1) *All her coalfields are within easy reach of the sea.*

This means that the coal can easily be carried to a port for shipment, either to other parts of the country, or to other lands. Coal is heavy, and costs much to send overland. It is much cheaper to send it by water.

Many of our coalfields border the sea-coast. One, the Cumberland coalfield, actually extends for some distance beneath the sea itself. Those coalfields which lie inland are nearly all in water-communication with the sea by river or canal, or both. So that carriage by water is possible for nearly all our coalfields.

Before the war Britain exported more than a quarter of the coal raised every year. Indeed, if we include all the coal which our big steamers carried away for use on their voyages, and other coal which was sent for coaling purposes to British outposts like Malta, Port Said, etc., the total exported was more than one-third of the coal raised per year in the Homeland. All this vast export trade means money; and it was possible only because nearly all our great coalfields lie near the sea or within easy reach of it.

(2) *Many of our coalfields have iron in plenty close at hand. Some coalfields have iron actually on them.*

This means that iron can be cheaply and quickly extracted from its ores. There is little or no expense of carrying the iron to the coal, or the coal to the iron, as has to be done in many other countries. Some countries have plenty of iron, but little or no coal.

## *Geography of the Homeland*

Others have coal, but no iron. Britain has both, and close together.

Iron means a great deal to a country if it can be easily smelted and manufactured. It means machinery, as well as the hundreds of things in every-day use which are made of iron or steel. Britain has become the greatest engineering country in the world, and one of the world's greatest iron-workers, chiefly because coal and iron are found together or within easy reach of each other.

The Scottish coalfields, most of the Pennine coalfields, and the South Wales coalfield, all have iron actually on them. The South Wales coalfield has such a big smelting business that thousands of tons of iron are shipped there from Spain to be smelted.

### BRITISH COAL

Our coal is the fossil remains of buried prehistoric forests. It has imprisoned in it the heat poured down by the sun upon the earth ages before the coming of the first men.

In most coalfields we find seam after seam of coal, each with its 'roof' of sandstone and its 'bed' of underclay, proving that forest after forest must have grown upon the same spot, only to be buried beneath tons of sediment and turned into coal. These seams vary in thickness from a few inches to several feet. In South Staffordshire there is a famous seam which sometimes consists of solid coal 30 feet in thickness. A seam like this can be easily worked, although the miner's task is never an easy one. But when he has to lie for hours on his side, cramped up in a narrow tunnel, working at a thin seam, far beneath the surface, the miner's work is very hard indeed.

## *British Coalfields*

Our coal, generally speaking, is of three main kinds—ordinary coal (Bituminous), Cannel coal, and Anthracite. Anthracite is the most valuable of all ; it is hard to light, but it gives out great heat, and burns a long while with very little smoke (which makes it particularly useful as fuel on warships). Anthracite occurs mainly in South Wales ; some is mined in Ireland. Cannel coal, found chiefly in Lancashire and in Scotland, burns with much flame, and is of great value for making gas.

There is another kind of coal, known as Brown coal, or lignite, only a little of which is found in this country. But in the United States and in Germany large quantities of it are raised.

We have said that Ireland has very little coal. She has to import much of the coal she uses on her railways and in her factories. But she has a great deal of peat, which is supposed to be the first stage in the long and gradual change from buried vegetable matter into coal. The Irish bog-lands contain vast beds of peat, which is in common use in Ireland for ordinary heating purposes. Peat is also found, and used in many parts of Great Britain, as most of us discovered during the war.

## OTHER MINERAL WEALTH

**N**EXT to coal, the most important mineral is iron. In the Homeland we have not only an abundance of iron, but fortunately for us a great deal of it occurs actually on, or very near, the great coalfields.

### IRON

There is plenty of evidence to show that iron has been worked in Britain ever since the Roman occupation. From Roman times down to the beginning of the nineteenth century the smelting of iron was chiefly carried on in regions where there was plenty of timber. Forested areas, like the Weald, provided the charcoal which was needed for smelting iron. The Weald, indeed, was the chief centre of the iron industry in these days, and it is said that the railings around St. Paul's Cathedral are made of Wealden iron. But forests were so badly despoiled by the charcoal burners as the need for iron became greater that it became necessary to pass Acts of Parliament for limiting the number of iron-smelting furnaces !

When coal came to be used for iron smelting the industry at once migrated to the great coalfields of the Midlands and the North of England. With such vast stores of fuel there was no longer any need to limit the number of furnaces, and as a result the iron industry developed at an amazing rate. Although there are now only a few small iron-smelting places in the Weald to-day, one can still see traces of the great industry which once had its seat there.

The map on page 49 shows the chief deposits of the iron ore which is worked in the Homeland at the present time. Perhaps the richest of all is that in the Cleveland district of north-east Yorkshire, where the great oolitic ridge overlooks the mouth of the Tees.



## *Other Mineral Wealth*

Coal is easily and cheaply obtainable from the Durham coalfield, and a great iron industry has sprung up at Middlesbrough—a town which has grown remarkably in consequence during the last fifty years.

On the coalfields of Yorkshire, Staffordshire, Shropshire, Derbyshire, South Wales, and Scotland, valuable deposits of what is known as 'clay ironstone' are mined. It is mainly this ironstone that has given rise to the vast iron and steel industries of the Black Country, of Sheffield, of South Wales, and of the Lowland Rift Valley of Scotland.

A very rich form of ore is hæmatite. This, and other iron ores, are mined in the Forest of Dean region, in South Wales, Lancashire, and Northumberland, and in the Barrow-in-Furness region of Cumberland. Barrow-in-Furness, like Middlesbrough, has seen remarkable growth during the last half-century.

### STEEL SHIPBUILDING

In our regional studies of the Homeland we shall deal in some detail with our great iron industries. But it may be worth our while at this point to consider an industry which is very much in the public eye at the moment, and which is dependent upon our supplies of iron ore. We refer to steel shipbuilding.

On the map, page 49, a ship has been placed opposite the ports where steel shipbuilding is chiefly carried on. Refer to an atlas, and find the names of the ports concerned.

In these days we naturally think first of steel war-ships. The greatest centres for this type of shipbuilding are the Tyne, Barrow-in-Furness, Pembroke, the Thames, Portsmouth, the Firth of Forth, and the Firth of Clyde. It is easy to see why the Tyne, the Forth, and the Clyde have become famous for their

## *Geography of the Homeland*

steel warships—as well as steel ships of all classes, for they are the sea outlets of important coal and iron fields.

But it is not so easy to account for the Thames and for Portsmouth. In neither case have we any coalfield near, and no important deposit of iron. All the raw material—iron—and all the coal must be brought to both places. What makes it worth while? Both are splendid natural harbours, both are important strategic areas, controlling the sea-approaches to the capital of the Homeland and the heart of the Empire. It is all this that makes it worth while to carry on steel shipbuilding, even when iron and coal must be brought some distance at considerable expense. There is also another point to consider. The Thames and Portsmouth were great warship-building centres in the old days of ‘British oak’ and ‘wooden walls.’ Men living there became skilled at the work, and all the special machinery for it grew up there. So it was natural that the shipbuilding should still go on, even when it became necessary to use new materials. We shall find many examples of this kind of thing when we come to consider the industries of the Homeland.

Belfast specialises in great steel liners. Some of the biggest ships afloat have been built there. Now Belfast has a small ironfield behind it; but it has little or no coal. But luckily, it is within easy sea-distance of the Ayrshire coalfield of Scotland and the Cumberland coalfield. The Tees ports, too, specialise in steel shipbuilding, so does Liverpool. Smaller work is carried on at the Humber ports, and at Cardiff.

### COPPER, TIN, AND LEAD

Long before the coming of the Romans the southwestern peninsula of Britain was famous for its *tin*.

## Other Mineral Wealth

Tin was in great demand in the Ancient World, for mixed with copper, it formed bronze—the hardest metal known to men in those days. The traders of old undertook long and perilous journeys to fetch it. Britain in those times lay on the very fringe of the

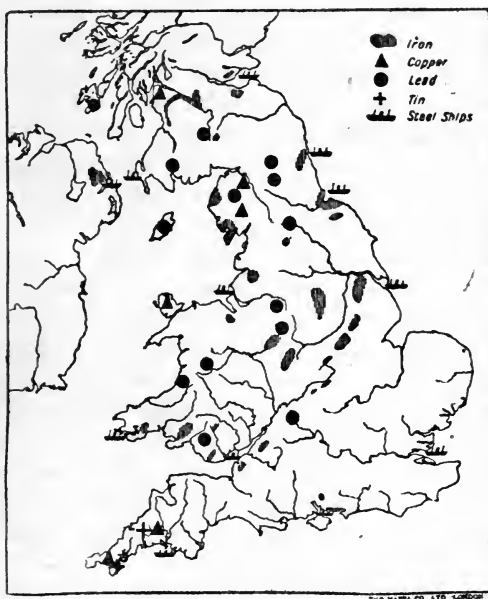


FIG. 10.—MINERAL DEPOSITS

then-known world, but those wonderful old navigators, the Phœnicians, found their way to Cornwall for the precious tin mined there. In exchange for little blocks and bars of tin, the Phœnicians gave the people of Britain salt, bronze goods, cloth, and dyes.

Even to-day this peninsula is our chief source of home-produced *tin* and *copper*, though our vast in-

## *Geography of the Homeland*

dustries swallow up a great deal more, which we have to import from other countries. Not only tin and copper, but also *lead*, *zinc*, *tungsten*, and the valuable rock which gives us *radium*, are found there.

The granites carry long veins of *tin* and *lead*; the slates are traversed by veins of copper. The richest mines are in the Camborne district, and in the St. Ives region. Most boys and girls have heard of the famous Botallack mine, which has a shaft running beneath the sea, and where the roar of the surf can be heard by the working miners. Sometimes a little salt water leaks through cracks into the mine, and the miners have to plug them with wooden plugs.

Devonshire has rich *copper* mines near Tavistock, and valuable lead mines in the basins of the Tamar and Teign, not far from Exeter. As in Cornwall, one can see in many places the workings of miners who got copper, tin and lead from these mines before the coming of Julius Cæsar. In Somerset, too, traces of these early miners are very common—especially in the Mendips, where good lead is still mined.

Other regions where *lead* and *zinc* are obtained are in the old rocks of the Lake District, in the Pennines of Northumberland, Durham, Derbyshire and Yorkshire, in Shropshire, in the Isle of Man, in Wales, in the Lead Hills of Southern Scotland, and in the hilly regions of Ireland. A certain amount of *silver* occurs with lead, but it is not always worth while to go to the trouble and expense of getting it. But in Wales, not far from the pretty town of Aberystwyth, the veins of lead were so rich in silver that at one time a ton of lead yielded as much as 38 ounces of silver.

The *copper* of Anglesey was, at one time, obtained in such large quantities that nowhere else in Europe were there such rich mines. Copper is still obtained

## *Other Mineral Wealth*

there, but, like the mines of Cornwall, the deposits are being gradually worked out. So small, indeed, are our home supplies of copper that the greater part of the copper smelted at Swansea—our biggest copper-smelter—is imported from abroad.

*Gold* is still found in very small quantities in Wales, Ireland and Scotland; but it is not worth while seeking for as a business enterprise. Long ago it was probably found in larger quantities, but has now nearly all been worked out. It is interesting to note that about 1793 there was actually a 'gold rush' in the British Isles! A nugget weighing over 21 ounces was picked up in a stream bed, and hundreds of would-be diggers and fortune-hunters rushed to the spot only to find their hopes disappointed.

### OTHER USEFUL MINERALS

*Salt* occurs in Britain, either in the form of rock salt, which can be mined like coal, or (more usually) in brine-springs, from which the liquid is pumped and the salt obtained by evaporation. The most famous salt mines lie in the Weaver Valley of Cheshire, where Nantwich, Middlewich, and Northwich are noted producers. Much of the salt obtained here supplies the great chemical industries of St. Helens, Widnes, and Runcorn—all of which supply the cotton towns with soda and hydrochloric acid. Other famous deposits of salt occur at Droitwich, in Worcestershire, and in the lower valley of the Tees.

*Oil-shale*, when distilled, yields not only oil, but also wax and ammonium sulphate. The Scottish coalfields are the biggest producers, especially in Linlithgow. A little is produced in Flintshire.

Experts agree that England is probably rich in petroleum, and several experimental bores are being

## *Geography of the Homeland*

driven to-day in the hope of making 'a lucky strike.' If they are a success, we may be able very largely to supply the needs of the Homeland in this valuable product. At present the bulk of our supply comes from abroad.

*Clay* for pottery is found chiefly in Cornwall and Dorsetshire. Coarser clays are found in Staffordshire and in many other parts of Britain.

*Building stones* are quarried in many places in the Homeland. The *slates* of Wales and Cumberland, the *granites* of Aberdeen and north Ireland, the *marbles* of Western Ireland and Derbyshire, and the *freestone* of the great oolitic ridge of England are well known.

# POPULATION

THE last official count of the population of the British Isles was taken on the night of Sunday, April 2, 1911. This 'numbering of the people' is known as the *census*—from the Latin word *census*, a register—and takes place every ten years. From the records of the last census we abstract the following figures :—

COUNTRY	NUMBER OF PEOPLE.
England . . . . .	34,045,290
Scotland . . . . .	4,760,904
Ireland . . . . .	4,390,219
Wales . . . . .	2,025,202
Isle of Man . . . . .	52,034
Channel Islands . . . . .	96,900
BRITISH ISLES . . . . .	45,370,549

## POPULATION AND AREA

The above table does not tell us very much, but what it does tell us is important. In order to understand it properly we must examine another table, which gives us the relative areas of the regions mentioned in the first table.

COUNTRY.	AREA IN THOUSANDS OF ACRES.
England . . . . .	32,388
Scotland . . . . .	19,070
Ireland . . . . .	20,248
Wales . . . . .	4,750
Isle of Man . . . . .	141
Channel Islands . . . . .	44
BRITISH ISLES . . . . .	76,641

England contains by far the greatest number of people. England, too, has the greatest area, as may

## *Geography of the Homeland*

be seen from the second table ; but even then her population is much bigger in proportion. There must be a reason for this. In England there are more people because there are bigger and better opportunities for getting a living. People naturally flock to places where there is plenty of work and good pay. Again there is less waste land in England than in any other part of the British Isles. Scotland is largely filled with mountain and moorland, so is Wales ; while a great deal of land in Ireland is bog or wild country.

Look at the figures for Scotland and Ireland. Both, roughly speaking, have about the same area, and have about the same number of people. But if we look at a population map of the British Isles we shall find that while Ireland's population is more or less evenly distributed, Scotland's is almost all concentrated in the Lowland Rift Valley between the Grampians and the Southern Uplands. The reason for this we shall see in a moment.

Wales is very much smaller than England, or Scotland, or Ireland, so we expect a much smaller population. But if we examine the figures closely, and take into consideration the size of the countries, we find that Wales is much more densely populated than either Ireland or Scotland. Look at the population map again, and notice how most of the people of Wales live in the southern part, and that the population is exceptionally dense just north of the Bristol Channel ; while the middle and north are very thinly peopled.

### POPULATION AND INDUSTRY

Opportunities for work decide very largely the distribution of a country's population.

Much depends upon the kind of work. In regions where farming is the chief industry there will be fewer



## *Population*

people than in regions where there are big manufactures and busy trade, because more people are needed to carry on manufactures than are required to do farming. Again, the kind of farming matters a good deal. If the farming is chiefly stock-rearing, the population will be much less dense than if the chief business is growing crops or fruit. For stock must have room to graze, and a single herdsman can take care of many cattle, or horses or sheep; but many more workers are needed to plough, sow, tend, and reap crops or manage orchards and fruit gardens.

If we place side by side (1) the population map of the British Isles, and (2) the map of British Coalfields, we find some remarkable correspondences. In almost every case we find that the coalfields are the chief regions of exceptionally dense population. As a matter of fact, we could almost use the population map of the British Isles to find out where the great coalfields lie. All we have to do is to notice the areas of densest population! We might be wrong in one or two cases—the London and the Dublin areas, for example, whose dense populations are due to other causes. But everywhere else we should be fairly correct. Why is this?

On the coalfields our biggest manufactures are carried on, because the coal supplies power, heat, and light; and the iron usually found with it, or near it, provides material for machinery and tools used in the various industries. To carry on these manufactures vast armies of workers are necessary. And not only workers in the mines and factories, but workers on the railways, roads, rivers, and canals by which the goods are transported from place to place, workers in offices where business is done, and yet other workers who help

## *Geography of the Homeland*

to feed, house, and clothe all these. So it comes about that our busiest and most densely populated regions are the coalfields of the Homeland.

As for London and Dublin—each is a metropolis, where the chief business offices, banks, and sale-rooms are to be found, and where the transactions of world-trade are carried on. Each is, too, the political centre, and the natural meeting-place of important people in business, in politics, in art, in science, and in all branches of learning. Neither has a coalfield even close at hand ; yet both carry on considerable manufactures. In London almost every kind of manufacture is carried on, on a small scale ; but this chiefly to supply its enormous needs. London proper had a population of 4,511,685 in 1911—more than the whole of Ireland, and nearly as many as the whole of Scotland. Greater London—London with its ring of suburbs—had a population of 7,251,358 ; and all these people were crowded into less than 700 square miles of country ! Greater London has a bigger population than the whole of Canada, and more than half as many again as the whole of Australia. The reason is that in London much of the world's business is done. Every great firm, every big railway, every important enterprise, has its 'London office' ; besides, London's oversea trade is the greatest in the world. A great army of workers is necessary to carry on all this enormous business.

### POPULATION AND SURFACE RELIEF

Now let us place side by side (1) the population map of the British Isles, and (2) the map showing the relief of the land.

Certain facts at once appear very clearly. Most people live in the lowlands ; fewest people live in the highlands. In the mountainous parts much of the land

## *Population*

is waste, and cannot be cultivated. A certain amount of stock-rearing and forestry may be possible ; but these are not industries which demand the services of many workers. The climate, too, is not so suitable as it is in the lowlands. It is colder, wetter, and much more windy, and in winter large areas of mountain land are under snow.

So clearly is the difference between mountain and lowland marked on the population map, that we can almost use it to show where the chief highlands are ! Look at Scotland. Notice how clearly the Northern and Central highlands and the Southern uplands stand out. Again, look at Wales, and see how prominently the mountain lands stand out as regions of scanty population.

Even in England we can trace not only the Cumberland mountains and the Pennines, but much lower ranges and masses—Exmoor, Dartmoor, the Mendips, and the North York moors ; and even Salisbury Plain and the chalk ridges that branch out from it to form the Chilterns, and the North and South Downs. All these regions are comparatively scantily populated.

The mountains of Ireland, too, stand out very clearly on the population map, for even the boglands of the Central Plain are much more densely populated than the highland regions. Find the mountains of Donegal, Wicklow, and Kerry ; and notice how the hills in the plains are indicated by a lower density of population.

A good test of one's knowledge of the relief of the Homeland is to take the population map as a guide, and name the highlands as indicated there by the colouring which denotes exceptionally scanty population.

# *Geography of the Homeland*

## BIG TOWNS AND CITIES

It is perhaps unnecessary for us to remind ourselves that the very densest of all populations in the Homeland occur in the big cities and towns. London, for example, has about 6,000 people to every 100 acres ; Liverpool has 4,500 to 100 acres ; Manchester, 3,200 ; Birmingham, 1,900 ; and Leeds, 2,100.

When we realize what this tremendous crowding together of people means, we begin to understand why many families can find house-room only in conditions hardly fit for human beings, and why after the war there are in our big towns so many families who cannot get a house of any sort to live in. For during the war house building was almost entirely suspended. People increased in numbers, but houses did not increase ; with the result that we are hundreds of thousands of houses short.

People must be within easy reach of their work, especially if their pay is so small that they cannot afford to spend money on railway or tram fares every day. Very often they must be content with wretched houses, or even a squalid room or two, so that they may make ends meet. One of our greatest problems is this question of overcrowding in our big towns, for it affects the health and the lives of the workers, and so hinders the building up of a strong, useful and contented nation.

If we take England and Wales, we find that more than half the total population is to be found in the big towns. The same is true of Scotland. But in Ireland only about a quarter of the people are really what may be called a 'town population.'

Every big town is where it is for very definite reasons. It did not grow up by accident ; it sprang

## *Population*

up where it did because there happen to be certain conditions at that spot which must result in the development of a town.

Some towns have grown because they are near materials which can be used in manufactures ; others because a number of roads meet at that spot ; others because they happen to be ports on deep and useful harbours. As we continue our study of the Homeland we shall deal with the chief reasons which explain the existence of our big towns and cities, and which explain, too, why some towns have grown enormously during the past twenty years, while others have grown smaller.

Here are the populations of some of our largest towns. Try to find reasons why so many people are gathered together in these spots.

TOWN.	POPULATION, 1911.	
	(Nearest thousand.)	
Greater London . . . . .	7,251,000	
Manchester and Salford . . . . .	946,000	
Birmingham . . . . .	840,000	
Liverpool . . . . .	746,000	
Manchester . . . . .	714,000	
Sheffield . . . . .	460,000	
Leeds . . . . .	446,000	
Bristol . . . . .	357,000	
Bradford . . . . .	288,000	
Hull . . . . .	278,000	
Nottingham . . . . .	268,000	
Newcastle . . . . .	267,000	
Glasgow . . . . .	784,000	
Edinburgh . . . . .	320,000	
Dublin . . . . .	406,000	
Belfast . . . . .	387,000	

## *Geography of the Homeland*

One of the most remarkable features of town growth in the Homeland is the tendency for groups of big towns to grow out towards one another, and so form not only 'town clusters,' but what are really huge towns. Examples of this are the 'Five Towns' of the Potteries, the Birmingham 'Town Cluster,' and the town clusters of South Lancashire and the West Riding of Yorkshire.

## A MANUFACTURING REGION AND ITS NATURAL OUTLET

ON the population map of Britain certain areas stand out as regions of exceptionally dense population. In our last chapter we pointed out that in most cases the main reason for this is the presence of coal, or coal and iron. But although the presence of coal and iron is the *chief* reason for the great town clusters of these densely populated regions, there are other regions which vary more or less with each area.

Let us select one of these densely populated regions and discover some of the more important causes of the great industries which have drawn together such a large number of people.

### THE LIVERPOOL-MANCHESTER AREA

South Lancashire stands out very clearly on the population map as a very densely populated region. In it two great cities stand out equally clearly—*Manchester* (with Salford), the second largest city in the Homeland, and *Liverpool*, the second largest port. The only city in Britain greater for population than Manchester and more important as a port than Liverpool is London.

Grouped around Manchester, and especially just north and north-west of it are a number of large and busy towns so thickly placed that they form almost one huge town cluster. Liverpool is the gateway for the whole of this busy manufacturing district ; through Liverpool go the goods manufactured, and through Liverpool come the vast overseas supplies that are necessary to support so many millions of workers.

The Liverpool-Manchester area provides us with

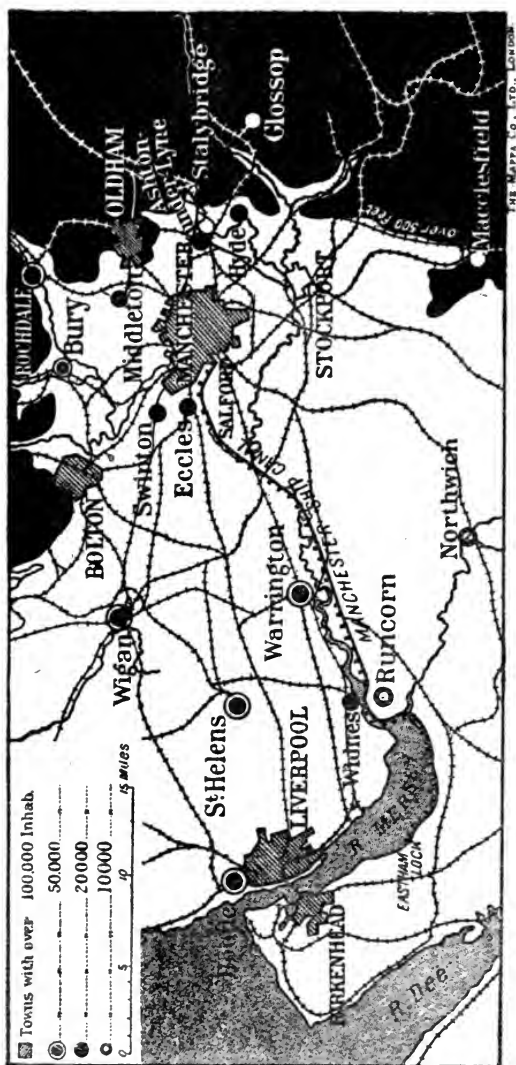


FIG. 11.—THE LIVERPOOL-MANCHESTER AREA, A TYPICAL MANUFACTURING REGION.  
(LAND OVER 500 FEET MARKED BLACK.)



## *A Manufacturing Region*

an excellent example for the study of a big manufacturing area, and its natural outlet to the sea and the world's markets.

Notice first the position of Liverpool on the Mersey estuary. It sprawls along Merseyside for miles, and cannot be marked on a large-scale map by the usual dot which is used for a town. Opposite Liverpool is Birkenhead, which is practically a suburb of Liverpool, for it is connected with Liverpool by a railway under the Mersey, and by a wonderful system of day and night ferries. The Mersey here is much too wide and far too busy for a bridge.

Now look at Manchester, at the foot of the slopes of the Pennines; notice, too, the grouping of many other big towns in similar positions at the foot of the slopes, or on the lower slopes themselves.

Between these town groups and Liverpool towns are not so thick, and villages not so common. This is because before the coming of the railways the 'Mosses,' or bogs of the middle Mersey valley, more or less cut off the Liverpool region from the Manchester region. Even to-day Birkenhead has many more first-class roads leading out of it than Liverpool has. But the cutting of canals, and especially the building of railways, brought the Manchester area into very close touch with its natural sea gate, the Mersey.

### THE MAIN INDUSTRIES

What is the business that provides the millions of workers in this area with a living? It is the biggest business carried on in the Homeland—the business that employs most workers in a single area, and that provides the first and most important of Britain's long list of exports—the cotton industry.

## *Geography of the Homeland*

Why should the cotton industry be mainly concentrated here? Because the mild moist climate of South Lancashire is peculiarly suitable for the spinning of cotton, which breaks easily in dry air; and because it lies at the back of Liverpool, which is the most convenient port for importing the raw material from the United States (which sends us by far the greater portions of the cotton spun in the Homeland).

There are plenty of districts in the British Isles moist enough for the cotton manufacture; but only South Lancashire has a sea-gate like Liverpool, which lies facing the land whence we get our chief supplies of raw cotton, and facing the searoads by which the manufactured cotton goods go to the markets of the world.

South Lancashire has other advantages for this great industry; it has a rich coalfield with iron close by. That is to say, it has its own sources of power, light, and heat; and also the material for the making of the machinery used in the industry. Close by, too, as we shall see later, lies the chief raw material for the production of certain chemicals which are used in the preparation of cotton and cotton goods. Here, too, is a teeming population of workers skilled in cotton spinning and weaving and dyeing; and here are gathered together the finest machines the world can produce for the work.

A glance at the map will enable us to make a list of the chief cotton towns. Certain of these towns specialise in certain branches of the industry. At Bolton, for instance, fine spinning is chiefly done; at Oldham coarser spinning. Widnes and St. Helens specialise in dyes and dyeing; Oldham, again, specialises in spinning and weaving machinery. And besides all the big towns which we find marked on the map,

## *A Manufacturing Region*

there are numbers of villages where the cotton spinning and weaving are carried on.

The great heart of the cotton industry is Manchester, where the business part is done—where buyers from all the world over meet representatives of all the great cotton firms in the kingdom. The Manchester Exchange is the meeting-place of great business houses from all the chief countries of the world.

### OTHER INDUSTRIES

In this busy region many other industries are carried on. We have already referred to coalmining, the making of machinery, and the manufacture of chemicals.

The chief material which forms the basis of the chemical industry is the salt of the Weaver Valley, in Cheshire, which is made into soda and hydrochloric acid—both used in bleaching the cotton fabrics after they are spun. Besides St. Helens and Widnes, Runcorn is famous for this kind of work. All these towns produce dyes also for the printing of the cotton, and also have large glassworks.

Wigan specialises in coalmining and iron-smelting. Some towns—Rochdale, for example—have flourishing woollen industries, as well as cotton. Macclesfield, some miles to the south of Manchester, specialises in silk-weaving. Warrington turns the hides of Cheshire cattle, or hides from America, into leather in its enormous tanneries.

All the industries employ a large number of workers. We must remember, too, that a certain amount of agriculture and stock-rearing is carried on ; most of the produce is absorbed by the dense populations in the big towns.

## *Geography of the Homeland*

There is another industry, too, which deserves mention, and that is the 'holiday industry.' The tired workers in mine and factory need holidays, and naturally love to get away from the dull, smoky town in which they work. They go in their thousands to Blackpool and other seaside resorts on the Lancashire coast, they swarm on the steamers going to the Isle of Man, or take train for the Peak District, North Wales, or the beautiful Lake District of Cumberland. All this means work and money for those whose business it is to provide these millions of workers with transport, food, shelter and amusements when holiday time comes. It is strange to find that all these distant and widely separated holiday places are really linked with the busy manufacturing towns of South Lancashire ; but they are very closely related to it.

### COMMUNICATIONS

The whole region is covered with a close network of railways, bringing every town not only into touch with the city of Manchester and the port of Liverpool, but with each other. The chief lines are marked on the map.

The Manchester Ship Canal, which begins at Eastham Locks, on the Cheshire side of the Mersey, admits large steamers to the wharves of Manchester, thus making an inland town a seaport of considerable importance. It was constructed between 1887 and 1893. Its total length is about  $35\frac{1}{2}$  miles. By means of the canal cotton can be brought direct to Manchester without 'breaking bulk' at Liverpool. It can admit easily steamers which carry 10,000 tons deadweight, and Manchester carries on a direct trade with the Continent and with the Americas. Manchester has already beaten Liverpool in the petroleum trade.

## *A Manufacturing Region*

Along the route of the canal lie towns of considerable importance, for raw material can be brought to them by sea, and they have the advantage of being their own 'ports' for overseas trade.

Other canals are those which link the cotton towns of South Lancashire with the woollen towns of the West Riding of Yorkshire—the Leeds and Liverpool Canal, and the canals which run from Manchester to the Calder and to Huddersfield. These are the Trans-Pennine Canals, constructed through water-gaps in the Pennines.

*Liverpool* grew with the development of the cotton industry in Lancashire. It has the best dock and storage and railway facilities in the world, and its market is the world itself. It is much more than the port of Lancashire; it is the main exit for the many manufactures of the Midlands, and for the passenger traffic from London to America. It has great docks, a huge floating landing-stage, and enormous shipbuilding yards (especially at Birkenhead). Liverpool is the chief port for liners for the Americas, and several famous lines have their headquarters there.

Liverpool's imports are chiefly cotton, from the United States; grain, from Canada, the States, and Argentina; rubber, from the Amazon basin; meat, from the Americas; copper, wool, cattle, timber, and tobacco. Her exports are cotton goods, machinery and hardware from the Midlands, woollen goods from Yorkshire, and chemicals.

# THE ENGLISH MIDLANDS

**T**HE English Midlands form another important industrial area which is worth studying as a type of economic region some distance from the seaboard.

The accompanying diagram shows clearly how the Midlands are situated with regard to (1) the Pennines, (2) the Welsh Uplands, and (3) the great Oolite Ridge, which can be traced from the Cotswolds through the Edge Hills, the Northampton Heights, and the Lincoln Edge to the Humber.

## PHYSICAL FEATURES

Though the region forms part of the English plain, parts of it rather merit the name of plateau, for a considerable area is over 300 feet above sea-level, and in Charnwood Forest, the Clent Hills, and Cannock Chase the hills rise well over 500 feet.

Notice the three great natural gateways of the Midlands :—(1) The Trent Gate, leading to Hull and the Humber ; (2) the Midland Gate, leading to Liverpool and the Mersey ; (3) the Severn Gate, leading to Cardiff, Bristol, and the Bristol Channel. There are other ' gates,' which are not so prominent on the map ; and these are the gaps in the Oolite Ridge utilised by the railways and roads leading to the Thames Basin and the Port of London. From the Midlands, too, there are four natural highways into Wales :—(1) By way of the Midland Gate and the northern coast-plain ; (2) up the valley of the Upper Severn ; (3) up the valley of the Wye ; and (4) along the Plain of Gwent (the southern coast-plain of Wales).

Two great river-systems carry most of the Midland drainage—the Trent and the Severn, with their tributaries. Of these the Trent is by far the more

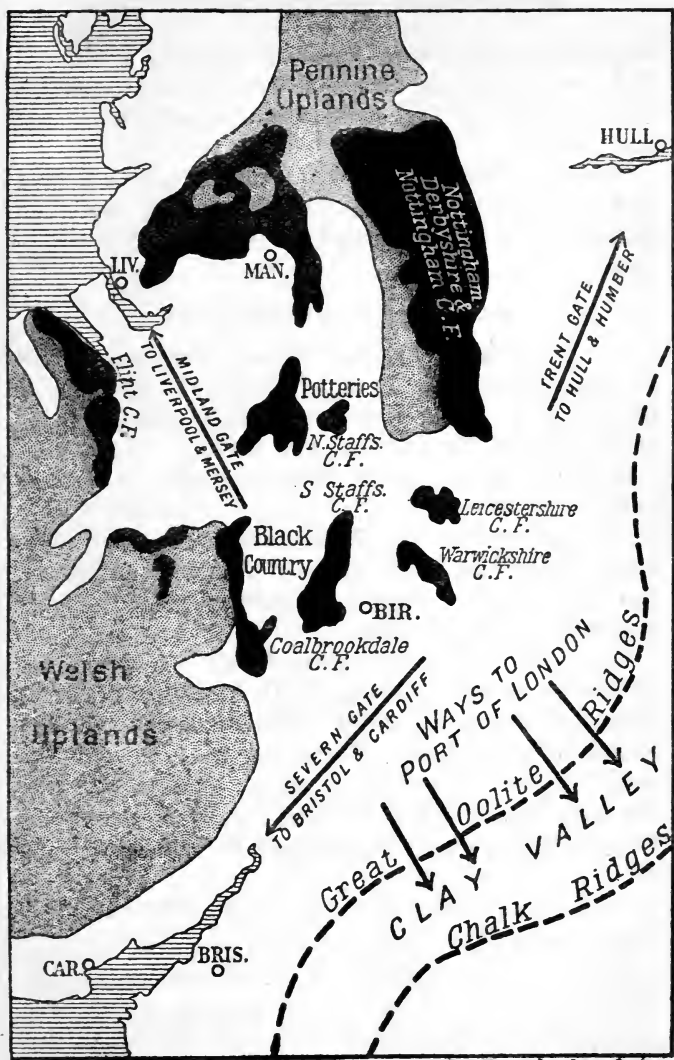


FIG. 12.—THE ENGLISH MIDLANDS

## *Geography of the Homelana*

important, since it has a much better outlet to the sea. The Avon tributary of the Severn flows through the heart of England, but is of little use as a commercial waterway.

The Trent feeders from the Peak District are clear and swift; those from the Midland plateau are much slower, because they rise in low hills, like the Warwick Avon.

### DISTRIBUTION OF POPULATION

The population map shows clearly three great areas of exceptionally dense population:—(1) The North Staffordshire region; (2) the Birmingham region; (3) the Derby, Nottingham, and Leicester region.

A glance at a map showing the coalfields at once supplies the reason.

Over the rest of the Midlands population is much more thinly and much more evenly distributed, for agriculture rather than manufactures provides most people here with a living.

The most prominent feature of all is the presence of two great town-clusters:—(1) In North Staffordshire (the *Potteries*), where Burslem, Hanley, Stoke, Newcastle-under-Lyme, Longton, and Tunstall lie closely together; and (2) In South Staffordshire (the *Black Country*), where lie Birmingham, Wolverhampton, Walsall, Wednesbury, Dudley, and Stourbridge.

### THE POTTERIES AND THE BLACK COUNTRY

The North Staffordshire coalfield supports the great industry of the *Potteries*, where earthenware and pottery goods of all grades are manufactured. The industry was at first dependent on the local clays, but as it developed supplies of the finest kaolin or china clay had to be brought in from Cornwall and Devon,



## *The English Midlands*

for the coarse clays of the Potteries could not be used for the manufacture of fine china and porcelain. The china clay comes by sea to the Mersey, and thence by the Birmingham canal and its branches to the North Staffordshire coalfield. The 'Five Towns' of the Potteries have grown and spread out towards one another until to-day they form practically one great town.

The South Staffordshire coalfield is the *Black Country*, where iron-ore occurs in the coal-measures. In the old days when iron was smelted by means of charcoal, the Forest of Arden, on the southern edge of the coalfield, supplied the necessary fuel, and Birmingham was the chief smelting centre. To-day coal is the fuel used ; but Birmingham is still the most important centre, although it is not actually on the coalfield. Near it on the north and west other great metal-working towns have grown up, which, like the 'Five Towns' of the Potteries, are growing out towards one another, and in course of time will form one great industrial town.

Not only iron, but other metals, are worked in these towns, for here are the necessary machinery and the skilled workers for such business. Certain of the towns, too, have specialised in certain branches of the metal industry : Wolverhampton specialises in locks and bicycles, Dudley in nails and chains, and Walsall in domestic hardware, especially iron bedsteads. Birmingham itself makes almost every kind of metal goods, from stoves to motor-cars, from pins and needles to scientific instruments.

### OTHER COALFIELDS AND INDUSTRIES

The Leicestershire coalfield differs from most coalfields in that it is not the home of a big manufacturing

## *Geography of the Homeland*

industry. For this reason there are no great industrial towns upon it as in the Potteries and the Black Country. Coalmining is the main business, and the coalminers live in quite small towns—some mere villages. The only town of importance on this coalfield is Ashby-de-la-Zouch. Leicester itself is some miles away from the coalfield, and is supplied with coal by rail. Leicester has important boot and shoe factories, and woollen mills.

The Warwickshire Coalfield lies between Nuneaton and Tamworth. Near it is the cycle and motor-car town of Coventry.

The Derbyshire and Nottingham Coalfield hugs the Pennines. It supports the silk-weaving and pottery industry of Derby, and the lace and hosiery industry of Nottingham. Derby has also great engine and carriage works, where most of the rolling stock of the Midland Railway is made. This coalfield supplies a large proportion of the house coal burned in the South-East of England.

Two other manufacturing centres deserve mention; Stafford with its boot and shoe factories, some miles south of the Potteries, and Burton-on-Trent, with its famous breweries, which depend on the special qualities of the local water supply.

Worcestershire, like Cheshire, has salt deposits; they are chiefly mined at Droitwich. Redditch, farther north, makes needles and nails; so does Bromsgrove. Worcester city has pottery factories. Kidderminster and Bridgenorth specialise in carpets.

### COMMUNICATIONS

The English Midlands are remarkably well served by railways, roads, and canals. Canals link up the four great exits with the heart of the Midlands; there is

## *The English Midlands*

water carriage to the Humber, to the Mersey, to the Port of London (by the Grand Junction Canal), and to the Bristol Channel.

The Great Western Railway crosses the Oolitic Ridges in three places to serve the Western and Central Midlands ; the London and North-Western line, the Midland, and the Great Central all pass across the area ; and the Great Northern Railway serves the north-eastern portion.

The great main exit is the Midland Gate, which is much more than the way to Liverpool and the sea. It is the way to the Americas and their busy markets. The whole of the Midland area is in this sense the hinterland of Liverpool, which is its great port for America.

## SOUTH-EASTERN ENGLAND

**S**OUTH-EASTERN England—that is to say, England east of a line drawn from Flamboro' Head to a point a little west of Portland Bill, is generally known as 'the English Scarplands.'

'*Scarp*' is the shortened form of 'escarpment,' which means the steep face of a ridge. The less steep and more gradually sloping face is known as the 'slope' of the ridge. South-East England is called the region of the English scarplands, because its characteristic features are the long ridges of hills with steep escarpments on one side and gentle slopes on the other.

In all of these 'scarps' a hard belt of rock comes slantingly to the surface. The ridges are formed by the hard 'end' of the belt, standing out and resisting the weather much more than the softer clays and gravels which form the valleys and basins. The scarps themselves are the steep faces of the hard ends of the belts of rock. (*Here the teacher draws on the blackboard the familiar diagram which appears in all good text-books.*)

### THE HILLS

The map on page 75 shows at a glance the characteristic features of South-Eastern England.

First trace the long ridges of hills. Western-most, and bordering the English Midlands which we studied in our last lesson, is the long ridge of oolite (or limestone), known as the *Oolitic Ridge*. It can be traced on the geological map as a continuous belt of oolite, stretching from the English Channel West of Portland Bill to the Humber. Beyond the Humber it appears in North-East Yorkshire as the North York Moors and the Cleveland Hills.

On the physical map of England the Oolitic Ridge passes through the *Cotswold Hills*, *Edge Hills*, the

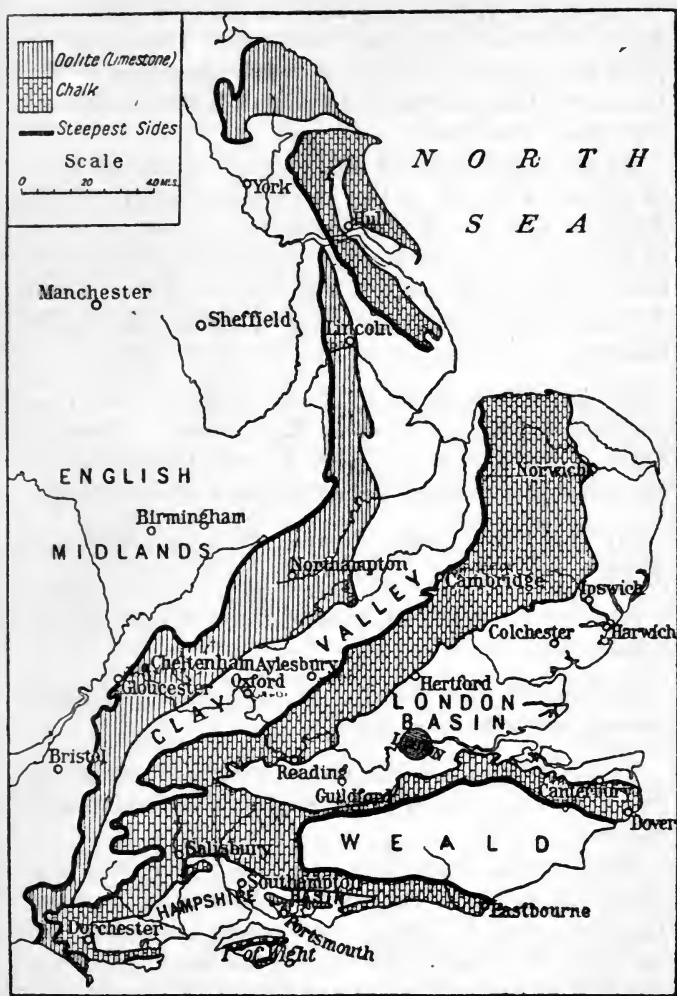


FIG. 13.—SOUTH-EASTERN ENGLAND

## *Geography of the Homeland*

*Northampton Heights*, and *Lincoln Edge* to the *North York Moors* and the *Cleveland Hills*. The scarp, or steep face, looks to the west throughout, except in the *Cleveland Hills*, whose escarpment looks northward over the *Lower Tees*.

All the other ridges of hills marked on our map are of chalk. The key to the arrangement of the *Chalk Ridges* is *Salisbury Plain*, which, by the way, is not a plain at all, but a low plateau some 500 feet above sea level, with deeply entrenched river valleys. From *Salisbury Plain* four great lines of chalk hills can be traced :—

(1) The *White Horse Hills*, the *Chilterns*, the *East Anglian Heights*, and *Norfolk Edge* ; continued on the other side of the *Wash* in the *Lincoln Wolds*, and on the other side of the *Humber* in the *Yorkshire Wolds*.

(2) The *North Downs*, passing through *Surrey* and *Kent*.

(3) The *South Downs*, passing through *East Hampshire* and *Sussex*.

(4) The *Western Downs*, or the *Dorset Heights*, passing through *Dorsetshire*.

The *North* and *South Downs* merge Westward in the *Hampshire Downs* (connected by a low ridge with *Salisbury Plain*).

Where these *Chalk Ridges* come to the sea, they stand out boldly in high white chalk cliffs, or headlands. At their feet lie tumbled masses of chalk spread out upon the beach. The sea has cut in at the foot of the cliff, until the chalk above falls of its own weight. Not only sea, but weather has done its share of this breaking down.

## South-Eastern England

The physical map shows clearly where each chalk ridge comes to the sea in bold chalk cliffs :—

(1) Comes to the sea, first in *Hunstanton Point*, on the eastern side of the Wash, and afterwards in the promontory of *Flamboro' Head*.

(2) Comes to the sea in the 'white cliffs of Dover,' at the *South Foreland* and *Shakespeare Cliff*.

(3) Comes to the sea in *Beachy Head*, the loftiest of all, and the highest promontory in England. Children who have been to Eastbourne will know it well.

(4) Comes to the sea in the *Foreland*, just south of Poole Bay.

The scarps or steep faces of the chalk hills are marked on our map. Note that (1) has its scarp facing westward, like the Oolitic Ridge ; (2) faces south ; (3) faces north ; and (4) faces part west, part south.

### THE VALLEYS, BASINS, AND RIVERS

Between the long ridges of oolite and chalk lie the valleys and basins and plains, where most of the people of South-Eastern England live. The chief are shown on our map. Notice particularly :—

(a) The long Clay Valley ending in the Fen District (the basin of the Wash Rivers), between the Oolite Ridge and the longest Chalk Ridge.

(b) The London Basin and the plains of East Anglia between the longest Chalk Ridge and the North Downs.

(c) The Weald, between the North Downs and the South Downs.

(d) The Hampshire Basin between the Downlands and the sea.

## *Geography of the Homeland*

Trace the chief rivers which water these fertile valleys and plains.

The first group is the series of streams flowing into the Wash—the *Witham*, *Welland*, *Nen*, and *Great Ouse* (the longest). All these rivers are sluggish and rather winding. All rise in the Oolite Ridge ; but the Ouse has feeders from the chalk (*e.g.*, the *Cam*). The *Witham* is a geographical curiosity. It rises on the *western* side of the Oolite Ridge, and cuts *through it* at Lincoln to gain access to the Lincoln Fens and the Wash. At one point (near Newark) it is only about four miles from the Trent !

All these rivers have the *Fens* at their lower ends ; indeed, it has been said that ‘ the Fens are in a sense the delta of the combined rivers.’ The Fens were once part of the Wash, but the tons of fine silt brought down by these big sluggish rivers have gradually filled up the old estuary, turning it from shallow water to marsh from marsh to dry land. The Wash itself is full of shallows, and is growing smaller and shallower every year, chiefly from this very cause. The change from marsh to dry land has been enormously hastened by careful drainage—by the cutting of drainage channels like the Bedford Level, and by the installation of big steam pumps, sluices, and windmills. The whole region of the Fens resembles Holland in many ways. There are the same broad, low stretches of flat plain, the same long, straight drainage channels, the windmills, and the long lines of embankments to keep out the sea and to keep the Fen waters within bounds in time of flood (especially after heavy rains).

The *Thames* is a river which we must consider by itself. Its seven head streams rise in the oolite of the Cotswolds and flow down into the Upper Thames Basin, which has Oxford for its centre. The river then



## *South-Eastern England*

cuts through the chalk in a deep gap between Wallingford and Reading, and so makes its way into the Lower Thames Basin—or the London Basin, as it is generally called. In the London Basin the Thames receives tributaries (*a*) from the chalk ridges of the Chilterns and East Anglian Heights; (*b*) from the basin of the Weald. The last series of tributaries is remarkable because all have cut deep gaps in the chalk in order to get through to the London Basin. The chief of these chalk gaps are the Guildford Gap, where the Wey cuts through; the Dorking Gap, where the Mole cuts through; and the Rochester Gap, where the Medway cuts through.

Another group of streams is that of East Anglia, all flowing from the chalk ridges down the long slopes and over the flat lowlands to wide and muddy estuaries in the great Thames estuary itself. The *Yare-Waveney* system has the Norfolk Broads in its lower course. These 'broads' are still unfilled remnants of the old estuary into which the Yare-Waveney once flowed. They are broad, shallow lakes, connected with each other and with the rivers by streams and 'cuts,' and surrounded by wide marsh lands and meadow lands. Other rivers worth noticing are the *Orwell* (Ipswich), the *Stour* (Harwich), the *Chelmer* (Chelmsford) and the *Crouch* (Burnham). It was up the wide mouths of these rivers that the Saxon sea-pirates and the Danish sea-rovers penetrated in their frequent raids on this part of England—raids which soon became organized invasion and settlement. With their light shallow-draught boats these invaders went far inland, and yet were always sure of a ready retreat by water.

The last group we have to consider is the south-coast group, flowing into the English Channel. Some of these (the *Sussex Ouse*, the *Adur*, and the *Arun*), rise in the

## *Geography of the Homeland*

Weald, and cut their way through deep gaps in the chalk of the South Downs, just as the south-bank tributaries of the Thames have done through the North Downs.

The *Itchen* (Winchester) and the *Test* flow into Southampton Water from the Hampshire Downs. The Salisbury *Avon* comes down from Salisbury Plain. These are the main streams of the Hampshire Basin. Farther east, the *Rother* flows from the Forest Ridges of the Weald to the sea at Rye, near the low shingly cape of Dungeness. Near its lower end is Romney Marsh, which has been formed by the silt brought down by the river. When the Romans were masters of Britain this marsh did not exist; instead of it there was a wide shallow bay, which the Roman Galleys often used as a harbour. On it stood the Roman *Portus Limanus*, to-day called Lympne.

### CLIMATE

Generally speaking, South-Eastern England has the driest and the most extreme climate in the British Isles. Perhaps we should say 'least equable' rather than 'most extreme,' for nowhere in Britain is the climate 'extreme' in the sense that it is on the continent of Europe.

The Fens and East Anglia are coldest in winter and hottest in summer of all the regions of Britain. They have the greatest amount of yearly sunshine and the lowest rainfall. The main reasons are as follows:—

(1) They lie on the east and leewardside of Britain, and the warm wet winds from the Atlantic tend to become drier as they descend the long east-facing slopes.

## *South-Eastern England*

(2) They are nearest the continent of Europe, and are therefore most affected by continental extremes of heat and cold, especially when east winds blow.

All these factors have important influences on the productions and the occupations of the people.

# THE FENS AND THE CLAY VALLEY

**S**OUTH-EASTERN England offers many contrasts to the two regions which we have already studied. For our present purpose we select two : (1) Distribution of population ; (2) characteristic industries.

## POPULATION AND INDUSTRIES

Look at a good population map of England. Notice how in South-Eastern England the population is remarkably evenly distributed, except in the case of London and the region around it. In the English Midlands we found that several areas were very densely populated, while others were only moderately populated.

The population of South-Eastern England is so evenly spread because the chief industries carried on by the people are agricultural or connected in some way with agriculture and stock-rearing. In the Midlands we find dense populations engaged in manufactures, and much fewer people engaged in agriculture or stock-breeding.

The reason is clear. In the Midlands lie several large coalfields, on which a variety of manufactures can be carried on on a large scale, employing tens of thousands of busy workers. South-Eastern England on the other hand, has no coalfields, save in Kent, where as yet they have not been worked to any very great extent. Because South-Eastern England has no great coalfields there are no great manufactures, and the main type of industry depends upon the land. In regions of this kind the population is always much more evenly distributed. Fewer people are wanted for farming than for manufactures, and people are spread over the

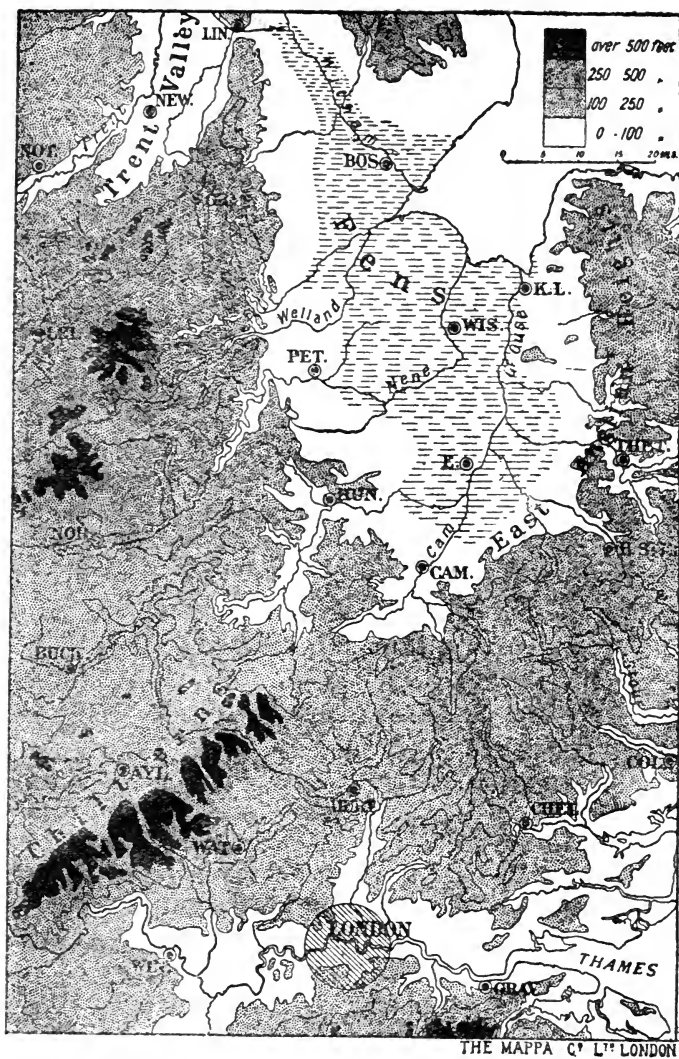


FIG. 14.—FENS AND THEIR SURROUNDINGS

## *Geography of the Homeland*

countryside in villages and small towns instead of being cooped up in big, busy, smoky cities on the coalfields.

Outside London the chief exceptions to what we have said as to the even distribution of population are the manufacturing centres of Northampton and district, of Norwich, and Ipswich, where flourishing industries employ many people, and the region of Chatham and Rochester at the mouth of the Medway, where Naval activities have brought together an exceptionally dense population.

What are the advantages of South-Eastern England as a farming and stock-rearing region ?

(1) The soil of the Clay Valley and the drained Fens, of the East Anglian Plains and the London Basin, of the Weald and the Hampshire Basin, is rich and fertile, and suitable to a large variety of crops.

(2) The fairly heavy soil in many parts, the long sunny summers and dry harvest-time make Lincolnshire, Bedfordshire, and East Anglia great wheat-growing regions. This area is by far the most important grain area in the Homeland.

(3) The rich soil and sheltered valleys of Kent, Sussex, and Hampshire support fruitful orchards and hop gardens. The rich silt of the Thames Valley gives rise to big market gardens, which have the advantage of London near by as a selling market for their produce.

(4) The grassy slopes of the Oolite Ridge and the Chalk Ridges are splendid grazing grounds for sheep. The rich meadowlands of the Clay Valley, the Fens, and East Anglia are suitable for the grazing of herds of fine cattle and droves of horses, as well as for poultry farming on a large scale.

# *The Fens and the Clay Valley*

## THE FENLANDS

Perhaps the most interesting region in South-Eastern England is the Fenland. This is the lowest and flattest part of the Homeland. In many places it is actually below sea-level, and the tidal waters must be kept back by big dykes, just as in Holland.

Most of us remember the Fenland as the refuge of Hereward the Wake, who, hid in his marshland stronghold, long defied the bold Norman invaders. In his time much that is now dry and fertile land was a maze of swamp and marsh, with here and there a low but solid island, rising a little above the waste of mud and water. The Isle of Ely, on which Ely is built, was an island of this type. Secured by its impassable marshes, its rivers, and tidal waters, Ely formed one of the principal 'camps of refuge' from the Norman conquerors.

The Romans, it is said, first began the work of draining the fens and turning waste marsh and swamp into solid, productive soil. But they did little, and the fens for centuries were wildernesses of sedge, alders, willows, guelder rose, and bog myrtle. The fen men used stilts or poled themselves in rude flat boats along the winding watercourses in summer. In winter the fens were locked with ice, and sledges and bone skates made communication easy.

All the time man's ceaseless struggle with the marsh and with the sea went on. Time and time again floods swept away embankments and swallowed up the little patches of reclaimed and cultivated land. But the greatest effort was made in the seventeenth century, when the Earl of Bedford and his friends undertook the drainage of the 'Bedford Level.' Since his day more and more of the fenland has been reclaimed from

## *Geography of the Homeland*

the marsh, and large areas to-day bear heavy crops. Cambridgeshire is to-day the county which has the highest percentage of arable land in the kingdom.

The drier lands yield heavy wheat and potatoes. Large areas have been turned into highly productive fruit-farms, and in several of the towns, especially at Histon, not far from Cambridge, there are flourishing jam and fruit-canning industries.

The pliant osiers of the fens give rise to basket-making, and in at least one region (near Wisbech) woad is still cultivated for the sake of its blue dye, which is manufactured on the spot. The woad, which in ancient days was used by the ancient Britons for painting their bodies, is used to-day for the dyeing of cloth. Mustard is also grown, and supports the mustard factories of Wisbech, Peterboro', and Norwich.

Peat cutting is a common fen industry. Fishing and wild fowling are carried on by the fenmen, who live in lonely little hamlets, or even in houseboats, and are a race apart.

The great fen centre is *Ely*, famous for its cathedral, which stands high above the levels, and can be seen for many miles. *Peterborough*, *St. Ives*, and *Huntingdon*, are important market centres. All stand on firm land at the edge of the fen, and make farm implements for use in the fenland fields. The clays of Peterborough make fine bricks. *Cambridge*, the famous University town, and *Bedford*, are also big market centres for the surrounding farmers. Bedford now has engineering works, and specialises too in the manufacture of straw-plait for hats.

The ancient fenland ports of *Lynn*, *Boston*, *Spalding*, and *Wisbech* are at mouths of rivers flowing into the Wash; the gradual silting-up of the estuary has robbed them of any chance of ever becoming important.



## *The Fens and the Clay Valley*

Stretching far inland to the south-west, between the ridges of the Oolite and those of the Chalk, lies the long, broad valley which is generally known as the 'Clay Valley.' You can trace it on the map as far as Dorsetshire; the Vale of Blackmoor, drained by the Stour, is part of it. The Upper Thames Basin, known as the 'Vale of Oxford,' or the 'Vale of Aylesbury,' is also part of it. So are the vales of Buckingham and Northampton.

Farming and stock-rearing are the most important industries, generally speaking; but at *Northampton*, *Kettering*, *Wellingborough*, and other places close by a very important boot and shoe industry has long been established. It probably arose there because of the abundance of hides which could be got from the local cattle. But nowadays the industry is so huge that local supplies are not nearly sufficient to keep the big factories going, and large quantities of hides have to be brought from overseas.

*Oxford*, the famous University City, is a market town also for the rich produce of its valley; though it is much more important to-day as a centre of culture. *Aylesbury* is another market town. It gathers up the produce of its vale, and is famous for its poultry. *Witney*, West of Oxford, makes blankets; here again we have an industry which grew up at first because of the excellence and abundance of local supplies of raw material—the wool from the sheep grazing on the Oolite and Chalk ridges.

A notable town in the southern part of this great Clay Valley is *Swindon*, which in some ways is the most important town on the Great Western Railway system, for there the fine locomotives and rolling stock in use upon the railway are manufactured and repaired.

## EAST ANGLIA

**E**AST ANGLIA proper consists of the counties of Norfolk and Suffolk. If we are to consider it as a geographical division, however, we are bound to include with most of Norfolk and Suffolk the greater part of the county of Essex. Further, we have to bear in mind that the westernmost part of Norfolk and the north-east portion of Suffolk belong to the Fens, and therefore have been already considered.

The region we have now to consider lies to the east of the East Anglian Heights, and includes them as its western limit. In a sense it is a long north-eastward extension of the London Basin, as may be seen from the map on page 75.

### THE BUILD AND DRAINAGE OF EAST ANGLIA

The chief feature of Western East Anglia is the Chalk Ridge, which consists of the East Anglian Heights and the West Norfolk Ridge, broken in the neighbourhood of *Thetford* by a wide area of heathland and sandy warrens known locally as 'Breckland.' The chalk comes to the sea in the low promontory of Hunstanton Point.

Down the gentle easterly slopes of the chalk ridge run the sluggish rivers which wind down to the North Sea and the Thames estuary. Almost the whole of these gentle slopes are covered with a thick deposit of clay, formed of the finely powdered fragments of rocks crushed by the passage of prehistoric glaciers, and of broken and rounded pebbles and river gravels. All this 'glacial drift,' as it is called, was left behind when the giant glaciers of the Ice Age melted. This mass of glacial drift is commonly known as 'boulder clay' *i.e.*, clay with boulders of all sorts and sizes scattered in it. It is partly the presence of this boulder clay that

## *East Anglia*

explains why East Anglia is one of the principal wheat-growing areas of Britain ; its fertility is due to the finely pulverised mixture of rock materials.

The coastline of East Anglia is peculiar and interesting. In Norfolk and the northern half of Suffolk cliffs of sand, gravel, and boulder clay are being rapidly eroded by the sea, and the eroded materials are being constantly swept southward to build up the shingle beaches of Orford Ness, the mudflats of Essex, and the sandbanks which lie thickly scattered in the broad estuary of the Thames. A remarkable example of the 'gaining of the sea upon the land' is afforded by *Dunwich*, which in early mediæval times was a city and a port of considerable importance. It was for many years the seat of a bishop, and at one time had many fine churches and monasteries, a king's palace, and a royal mint. To-day most of the old city lies beneath the sea, and a few scattered houses with the ruins of an ancient church tottering on the cliff-edge are all that remain.

In Roman times the Yare, Bure, and Waveney emptied into a wide estuary, which afterwards became silted up and barred by the formation of long sandspits on the seaward side, forming the series of shallow lakes, meres, and lagoons, known to-day as 'the Norfolk Broads.' Further south, in Suffolk, the River Alde, which comes within half-a-mile of the sea at *Aldeburgh*, flows for several miles more or less parallel to the coast before finally entering the sea below Orford Ness. Between the river and the sea lie wonderful ridges of shingle cast up by the tides. There seems plenty of evidence to prove that this river once entered the sea at Aldeburgh, but that its mouth there was barred by the formation of this great shingle spit.

The Orwell and Stour and the Essex rivers have

## *Geography of the Homeland*

long estuaries and broad mudflats, covered at high water by the tide from the sea, which penetrates some distance inland. Harwich harbour is the meeting-place of Orwell and Stour. Further South, at *Walton-on-the-Naze*, the sea has cut far into the thick boulder clay in tall clay cliffs.

### CLIMATE AND AGRICULTURE

This part of Britain has a climate which more nearly approaches a continental type than any other part of the Homeland. It has more sunshine and less rain than most other regions of the British Isles, and a greater range of temperature. The long, dry summers and early autumns are favourable to the cultivation of grain—wheat on the clay lands and barley on the sandier soils.

Norfolk and Suffolk contain more than 80 per cent. cultivated land. If we reckon arable land alone, the percentage for Norfolk and Suffolk is very nearly double the average percentage for the whole of England. On the drier pastures of the slopes sheep are reared; cattle and horses flourish on the meadowlands. Agriculture and stock-rearing are the main industries, and population as a natural consequence is remarkably evenly spread.

Two crops have been introduced into East Anglia of late years—sugar-beet and tobacco, both of which have already passed beyond the experimental stage. Before the war nearly half our sugar came from the Continent, chiefly from Germany. This sugar, of course, was beet-sugar. The sugar-beet grows well in East Anglia, and the only problems are the erection and equipment of sugar factories and the supply of sufficient skilled labour to run them. The industry has vast possibilities. The cultivation of tobacco has

## *East Anglia*

also been proved to be possible on a large scale. But it appears that special concessions in regard to the tobacco duty upon home-grown stuff are necessary in order that the undertaking may pay its way. Apart from the limitations stated above, there seem no reasons why East Anglia should not contribute materially to our supplies of both sugar and tobacco.

Norfolk and Suffolk have been under successful cultivation for many centuries, but Essex, in early and mediæval times, was thickly forested. Epping Forest and the adjacent Hainault Forest are the modern remnants of a great forest that stretched north of London for many miles.

### INDUSTRIES

Agriculture and stock-rearing are the main industries. Hence every important centre is a market town, and there are hundreds of smaller market towns scattered up and down the country. Names like *Newmarket*, *Stowmarket*, and *Needham Market* tell their own tale.

As a result of the main industry we find that the largest towns specialise in the manufacture of agricultural machinery—*Norwich* and *Ipswich*, for example. *Thetford* specialises in steam wagons and traction engines. The agricultural machinery and garden tools of Ipswich, once manufactured to supply local needs, now find their way to all parts of the civilised world.

Another result, too, is the manufacture of wool and boots at *Norwich*. The manufacture of wool had its origin in the settlement of Flemish weavers in the days of the Anglo-Norman kings at Worsted, near Norwich; and local sheep grazed on the uplands supplied the raw materials for their looms. The manufacture of boots had its origin in the production of leather from

## *Geography of the Homeland*

local cattle. Some silk is still manufactured in Norwich. There are flourishing starch and mustard industries, both fostered by the products of the neighbouring fields. Norwich has always been an important centre. It was, and is still, a 'strong hold.' The Norman kings found it worth while to build a great castle there; and the military authorities of to-day have strong garrisons on Mousehold Heath just outside the city, as a safeguard against invasion from the Continent. Norwich, too, has always been a religious centre, as its fine cathedral testifies. To-day, the Castle and the Cathedral are the most interesting features of the city.

*Ipswich* not only has big agricultural implement works; it has foundries of some importance and a large engineering industry. Flour-milling and wheat distribution and marketing are also worthy of note. It has considerable coasting trade in small vessels, which come up the Orwell to its wharves.

Fishing is a very important industry in East Anglia. It is mainly concentrated at *Lowestoft* and *Yarmouth*, whence big fleets of 'drifters' go out to reap the harvest of the sea. They are busiest in the herring season, and so great is the catch that much labour has to be imported to 'cure' or salt and pack the herrings. Large numbers of women and girls come regularly every year from Scotland and the North. One result of the rich yield of fish has been the establishment of big canneries and potted food factories in the neighbourhood. The herrings are caught chiefly in autumn in long drift nets. About the same time, too, multitudes of sprats are caught all along the coast, and millions of them are packed in boxes and despatched by the Great Eastern Railway to the great London fish market of Billingsgate.

Another interesting fishery centres on *Colchester*,

## *East Anglia*

whose oyster fisheries are well known throughout England. The oyster-beds are in the Colne estuary, and are carefully preserved. Colchester has a history which goes back to Roman times—and earlier. Like Norwich, it is to-day an important military centre, and ‘the prepared basis for the defence of the Metropolis from attack on the east.’

### OTHER TOWNS

*Harwich* is the most important strategic port on the East Coast of England. It is a base especially for light craft and submarines, and during the war was an important centre of operations against enemy submarines. Some of our most powerful seaplanes were made at *Felixstowe*, opposite Harwich. Felixstowe is better known to most of us as a summer holiday resort.

Harwich is the chief ferry port for Hamburg, for Antwerp, and the Hook of Holland. Steamers run regularly from Parkeston Quay in connexion with the Great Eastern Railway. The Harwich-Hook of Holland route is part of the most direct passage between London and Berlin.

*Chelmsford* is an important market centre, and the administrative centre of the county of Essex.

*Newmarket* has wide open ‘downs’ upon which many famous racehorses have been trained. Great races are held here.

Several well-known watering-places lie on the East Anglian coast. Yarmouth and Lowestoft are famous holiday resorts; so is *Cromer*. Other places worthy of mention are *Aldeburgh*, *Southwold*, and *Mundesley*. In the season trains from Liverpool Street to these towns are closely packed with holiday-makers.

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Two great main arteries of the Great Eastern Railway, with their branches, serve the whole of this region. One main line runs from Liverpool Street via Chelmsford and Colchester to Ipswich, throwing off a branch to Harwich at Manningtree. At Ipswich this line branches into two: (1) the 'coast' route to Lowestoft and Yarmouth; (2) the Norwich line via Haughley and Norwich to Cromer and Mundesley. The other runs from Liverpool Street up the Lea Valley to Bishop's Stortford, thence to Cambridge, Ely, King's Lynn, and Hunstanton, and throwing off a main branch at Ely for Norwich by way of Thetford.



# THE THAMES BASIN

## OUTLINE SCHEME FOR TEACHERS

**T**HE following outline scheme has proved itself practicable and successful in teaching the geography of the Thames basin as a regional home study. It presumes that pupils have studied the school area in fair detail, and that they have some grasp of simple geographical principles.

### I. PHYSICAL GEOGRAPHY

#### (a) *Upper Course.*

Relative positions and heights of hills ; long and short slopes. Effects of weathering as elevation of land took place.

Development of the various contributing streams. Springs. Character of upper course of river. Economic use. Main tributaries contributing to Thames headwaters.

#### (b) *Middle Course.*

Direction, speed, quantity, and carrying power of water. Nature and tendencies of its channel. Its tributaries. The widening valley, evidences of river action in this, alluvial deposits ; consequences.

#### (c) *Lower Course.*

General relief of basin (and consequent character of main stream) ; the transverse valleys and hills ; geological structure ; nature of contributory streams. Review of general development of main valley (briefly).

## *Geography of the Homeland*

*Shape*, widening towards sea (cf. river itself). *Slope*—use diagrams and section showing fall. *Size*, depth, volume of river, necessity for banks. General characteristics and scenery.

### (d) *Thames Estuary.*

Where river meets sea and current meets tide. Character of the stream—its size, speed, carrying powers, matter in suspension, and in solution. Thames reputed to carry 450,000 tons of *salts* in solution annually—about 200 tons an hour. Effects of meeting or joining the tides, on physical development of river—banks, bed, submerged delta, Sandbanks and channels in Thames estuary. How navigation is made safe.

## II. DEVELOPMENT OF LIFE IN THE VALLEY

### (A) PLANT LIFE.

Conditions—(a) Soil. (b) Climate.

Soils depend on nature of underlying strata, or on character of material transported by streams. Climate in this small area practically uniform.

1. *First Study of Climate* as a condition of life.

(a) Plants and animals require—(1) Sunshine—light and warmth. (2) Rain—moisture.

(b) Determining factors of climate (simply) of Thames Valley.

1. Structure and direction of valley—mountains, hills, slopes, and how they affect the amount of sunshine.

2. Height of land—affects winds, temperature.

3. Prevailing winds—direction, moisture, warmth.

4. Sea influences, warmth, moisture, winds.

## *The Thames Basin*

### 2. *First study of Soils*—how they affect plant life.

(a) Porosity, moisture, and drainage, depend on strata and arrangement of strata. Natural and artificial drainage. Springs and water supply. How they determine plant life. Typical localities in Thames Valley.

(b) Soils—their quality as dependent on strata.

1. How they affect plant life. Can plants grow at all; do they grow well? Which grow well?

2. Some typical soils—what flourishes upon them. Chalk, sand, and gravel, clay. Made soils and subsoils—relation. Soils suitable for timber, cereals, grass, roots, vegetables.

3. *General review* of physical conditions of plant life in the Thames Valley. More complete indication of the characteristic vegetable products with their localities.

### (B) ANIMAL LIFE.

#### *Introductory.*

Relation and independence of plant and animal life. All animal life depends ultimately on plants. How animals, birds, and insects assist plants.

#### *Conditions of Animal Life.*

Suitable food. Climate, physical surroundings (and water supply).

1. How plant life determines the animal life of sheep and cattle, horses and goats. Food, shelter and protection. Vegetation, trees, forests. Healthy influence on surrounding atmosphere, soil, etc. Typical vegetations support certain types of animals.

2. Climate and animal life. General discussion of dependence on climate, striking examples of present

## *Geography of the Homeland*

and past ages. General climate of Thames Valley and probable types of animals.

3. Physical build. How it affects animals. Typical animals of mountains and hills, valley, low and swampy places, land and water life. Relation of animals to soils—consideration of food and healthy conditions.

4. General review of the conditions of animal life in the Thames.

### (C) HUMAN DEVELOPMENT.

*Introductory.*—Man the highest type of animal. Highest life dependent on all preceding forms:—Conditions of climate and soil. Plant and animal life. Build or relief; mountain and river, land and water.

1. How *climate* affects man's life, comfort, development, culture, relation. Some typical climates and resultant inhabitants. The Thames Valley as the home of man. Suitability to produce high types.

2. *Animals.* Their place in the development and life of man.

(a) As enemies—the struggle for life and supremacy.

(b) As food supplies.

(c) As servants—helpers, protectors.

3. *Plants.*—Man's chief wants in cereals, fruits, etc.

(a) For his own food and health, comfort, and warmth.

(b) For his animals.

(c) For his various industries—manufactures, his buildings. Cultivation of plants—agriculture.

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4. *Soils*.—How soils affect man's life. Plants, animals, water, drainage, building, health generally. Some typical soils and what prospers on them. Chalk, clay, gravel, and sand. Mixtures. Soils suitable for growth of timber, cereals, grass, 'roots,' etc. Cultivation of soil ; effect on its production.

5. *Build or Relief* of the country—really a fundamental condition—relation to nature of soil and products. Build—mountains, hills, and valleys influence man's mode of life, occupations, home communications, health. Rivers—position, size, rapidity, purity are very important as defences, hindrances and aids to communication. Water supply, power, food supplies, fish.

6. *General Review* of the influence of physical conditions on man's life and development ; *general* application to Thames Valley.

### III.—THE THAMES VALLEY AS DEVELOPED BY MAN

#### (A) EARLY DEVELOPMENTS.

(1) Family and home. Choice of homes—how determined, consequent occupation. Influences ; nature of soil, water supply, and drainage. Fuel, safety, health.

(2) Grouping of families. Reasons. Family ties, mutual assistance and protection, co-operation in work and supplies. Villages ; what determines position, distance apart, typical occupations ; illustrate by reference in detail to typical areas in the Thames Basin.

(3) Means of communication—primitive paths and tracks. *Roads*.—Trade and intercourse of village.

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Modes of progress, on foot, on horseback—in vehicles with better tracks. Extension of road system. Facilities of road junctions for trade and intercourse. Rise of towns—market towns, conditions of development, average distance apart, relation to fords and bridges. Examples.

(4) Means of communication. Natural drainage and water supply. *Rivers*.—Rivers as natural and early means of conveyance. Advantages and disadvantages. Early control—to prevent floods. Banks, mountain water, dams. Early use of water-power in Thames Valley. Locks.

(5) Manufactures and industries. What they are and where found in Thames Valley. Dependence on physical conditions, products, demand. Chief centres of industry.

### (B) LATER DEVELOPMENTS.

(1) More complete *mastery of land*. Clearing forests, draining swamps, better water supply, artesian wells, more scientific farming, destruction of wild animals.

(2) Improvement of *roads*—renewed importance due to invention of cycles, motor-cars, etc. More scientific construction, better material.

(3) Mastering the *rivers*, forests, and *floods*, deepening, widening, banking rivers, control of course, control of traffic necessary. Wharves, quays, horse and steam haulage. Disappearance of fords, construction of bridges. River as a pleasure resort. Riverside homes, inns, houseboats, river sports.

(4) *Canals*.—Their relation to rivers, general purpose, connect Thames and Severn, Trent, etc. Cheap

## *The Thames Basin*

water carriage but slow. Conditions and principles of construction. Locks, junctions. How controlled—canal company, railway company, dues and charges. Life on canals.

(5) *Railways*.—Why built. Dependence on productions, roads, trade. Need for quicker and easier communication (long and short). How built. Relation to the relief of the valley, importance of gradient, how secured (tunnels, cuttings), surveying a railway. Purchase of land, avoiding difficulties, yet touching towns, supplying all wants, contrast of road, canal and river, and railway. Effects on towns, etc. Great Western Railway main line and branches. Other railways in Thames Valley linking up the system. Survey of all means of communication. *Centres* of traffic.

### (C) EARLY AND LATER DEVELOPMENT OF TYPICAL TOWNS.

*Banbury*.—Agricultural occupations and implements.

*Whitney*.—Sheep-farming and blankets — present tendencies.

*Oxford*.—The seat of learning.

*Windsor*.—The Royal home—its position and surroundings.

*Reading*.—Its biscuit factories and University College results of recent changes and show modern tendencies.

## IV.—LONDON

(1) *Early History*.—Reasons for its origin and growth. Locality. Centre of road, river, and sea communication, bridges, natural defences—river,

## *Geography of the Homeland*

swamps, meeting-place of the early kingdoms. Fortification, importance for foreign trade. Faces the Continent, importance of London at the conquest, Westminster and its abbey. Tower. Walls and gates of London ; present traces. London natural outlet of the Thames Basin.

(2) *London as Capital of England*.—How, when, why. Its rapid growth in size, wealth, industries, and importance. Its guilds and their influence. Famous buildings, kings' palaces. Development of political importance—centre of government. All roads, rivers, canals, and railways lead to London. Development of its industries, interests, trade, railways. London becomes the centre of the world's commerce.

(3) *The Port of London*.—Its gradual growth with development of trade. Needs supplied. Authorities who control river and port. Place and method of constructing docks ; reasons ; quays ; warehouses ; port dues. Development of shipbuilding and other industries on banks. Famous shipping companies and their docks. Trade. Types of shipping.

(4) *London as Market*.—Billingsgate and fish supplies. Smithfield and meat supplies. Covent Garden and fruit and vegetables. Mark Lane and wheat. Sources of supply : (1) Home ; (2) foreign. Methods of distribution.

(5) *Character of the Thames at London*.—Width, depth, volume, and cleanliness. Tidal and sewage influences. Effect of bridges on its navigation. Steamboat services. Embankment. The Pool of London. Communication between North and South. East of London Bridge. Tower Bridge, ferries, tunnels, Blackwall and railway. Thames conservancy and



## *The Thames Basin*

Police. Nature and extent of tides. Greenwich Observatory. Woolwich Arsenal.

(6) *Thames Estuary*.—Its geographical character—coast-line, submerged delta, causes. Dangers and difficulties of navigation, pilots and their work, tugs. Dredging the channels, avoiding the dangers, lights and signals (simply). The defence of the Thames entrances.

## GAPS AND GAP-TOWNS OF THE LONDON BASIN

**T**HE Basin of the lower Thames lies between the chalk ridges (the Marlboro' Downs and the Chilterns) and the sea.

From Reading, just below the point where the Thames has 'broken through' the Goring Gap between the Chilterns and the Marlboro' Downs, the river winds in wide meanders over its plain, fed by slow tributaries from the chalk heights of the northern rim of the basin, and from the Weald. The streams which flow in from the Weald have cut their way through gaps in the North Downs in order to reach the Thames Valley. To the casual observer of to-day this seems very remarkable, because the escarpment, or steep face, of the North Downs looks southward towards the Weald. The geological and geographical conditions which have made it possible for these rivers to saw their way through a chalk ridge which now stands four or five hundred feet above them will be fully explained in our next chapter.

### WIND-GAPS AND WATER-GAPS

The gaps in the rim of chalk hills which border the London Basin on north and south are of considerable geographical importance.

These gaps afford passage for the many roads and railways which converge upon London. They are of two kinds, 'wind-gaps' and 'water-gaps.' The former are 'dry,' and have no streams flowing through them; the latter are still occupied by the rivers which have been the main causes of their origin.

'Wind-gaps' are commonest in the Chilterns. They were probably made by the streams which have disappeared owing to slow changes in the drainage

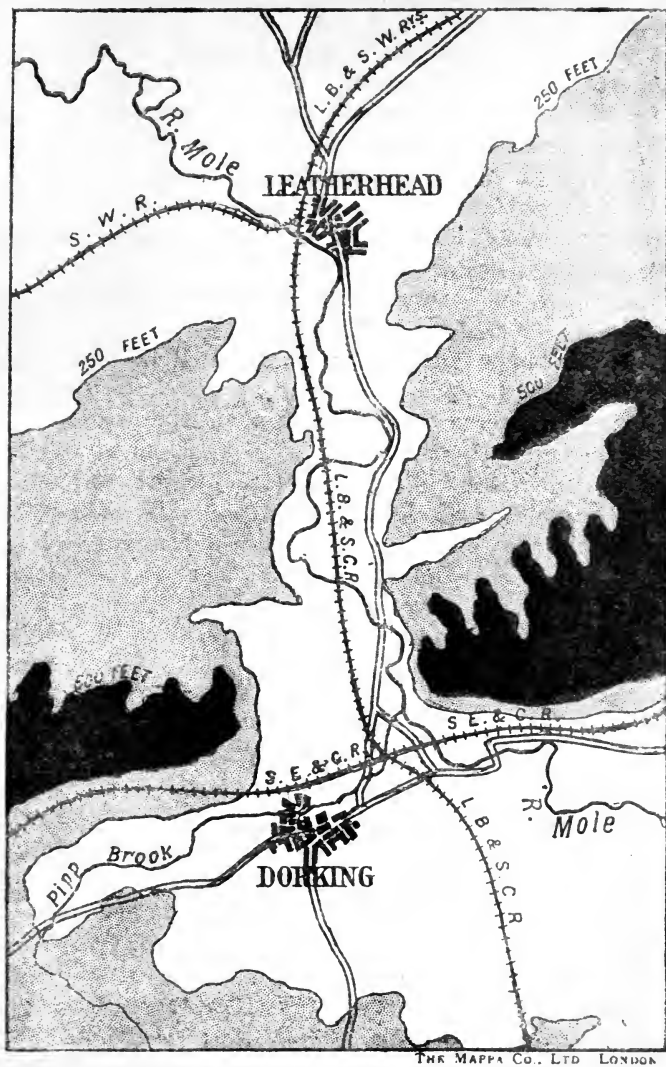


FIG. 15.—GAP-TOWNS

## *Geography of the Homeland*

system with which they were originally connected. But their gaps remain ; and these have been widened by the action of wind and weather until they have become practicable and easy ways for lines of communication across the chalk ridge. Through certain of these gaps the Romans cut their splendid military roads ; through others ran the main coaching roads of the 18th century ; and through the same gaps the railways from London to the North of England have been constructed.

' Water-gaps ' are most frequent in the North and South Downs. It is with those in the North Downs that we are immediately concerned. Here the *Wey*, the *Mole*, the *Darent*, and the *Medway*, all of which have their sources in the heart of the Weald, have cut for themselves deep notches in the chalk ridge. Through these notches pass the main lines of communication between London and the South of England. Like those in the Chilterns, these gaps have been widened by wind and weather ; unlike them, however, they still have the streams which were the main and original cause of their formation.

### GAP-TOWNS IN THE NORTH DOWNS

All traffic passing from one side of the chalk ridges to the other must converge upon one or other of these gaps, for they provide the only practicable route across the hills for roads and railways.

Where traffic converges towns are sure to arise ; and thus we find that every gap of any importance is a town-site. Such passages, too, are of great strategic value, even in modern warfare, especially if they occur on important lines of communication. Many of them were dominated by strong castles, which were kept fully garrisoned. *Guildford*, in the Guildford Gap, is

## *Gaps and Gap-Towns*

an excellent example. The old castle still stands. Strong military forces are posted on the heights overlooking the town, for Guildford commands a vital spot on the main line of communication between London and Southampton and Portsmouth. Guildford as a military station, is, in fact, one of the outer defences of the Metropolis.

Because much traffic passes through a gap-town, it tends to become a market, for travellers meet there from many directions. The exchange of products from both sides of the barrier is possible, and easiest at such points. For this reason many gap-towns are market towns even to this day.

The *Dorking Gap* (Fig. 15) has been cut by the Mole and widened by atmospheric denudation. *Dorking* is the gap-town, seated at the southern end of the gap through which pass the L.B. and S.C. Railway and the road to Worthing and the English Channel. *Leatherhead* commands its northern approaches. The diagram illustrates (1) how lines of communication converge to pass through a gap, (2) the sites of gap-towns, (3) the height of the chalk ridge above the gap on either side, (4) the passage of the river through it.

The *Merstham Gap*, about twelve miles east of the Dorking Gap, is much more important, for through it passes the main line from London to Brighton. To facilitate the passage of the railway, the Merstham tunnel had to be cut. The real gap-town here is *Redhill*, which stands at the southern entrance, at the cross-roads between London and Brighton, and east and west along the northern edge of the Weald.

The *Darent Gap* is commanded by *Sevenoaks* through which runs the main line from London to Tunbridge Wells and Hastings.

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The *Medway Gap* is nearer the Thames. *Maidstone* commands its southern approaches, and on its northern edge lies *Rochester* and the great naval area around *Chatham*. Through this gap passes one of the main S.E. and C.R. lines, linking Chatham with Dover.

*Canterbury*, the cathedral city, is also a gap-town. It commands the Stour Gap in the North Downs, and is the most important focus of road and railway in the south-east of England.

### GAP-TOWNS IN THE CHILTERN

The three greatest railways to the north have to pass the barrier of the Chilterns.

The London and North-Western crosses the Chilterns by the *Berkhamsted Gap* at a height of 450 feet. Through the same gap goes the Grand Junction Canal, which is part of the great canal route between London and Birmingham.

The Midland Railway passes the Chiltern barrier at a height of over 400 feet, by the *Luton Gap*, beyond which it runs down to Bedford and the valley of the Great Ouse.

The Great Northern makes the easiest passage of all by means of the low *Stevenage Gap* beyond which lies Hitchin and the road to Cambridge.

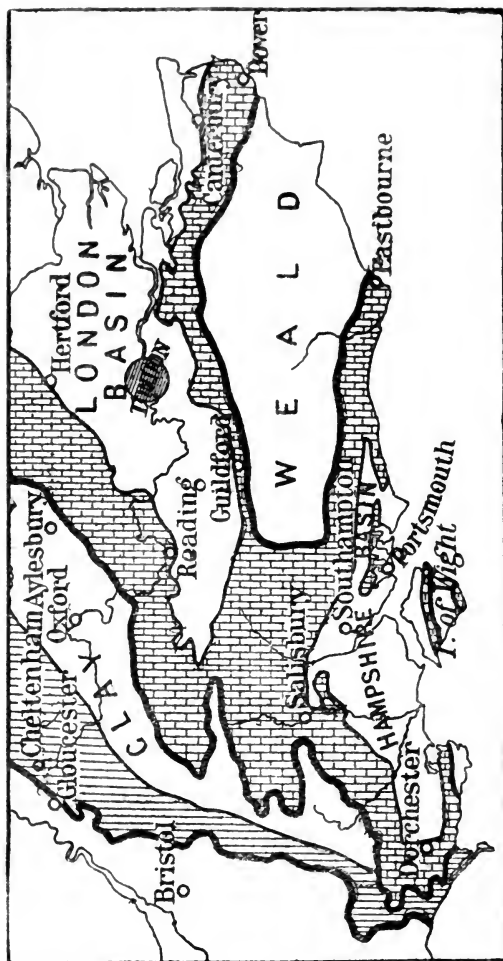
At the approaches to all three gaps, just where the railways and roads begin to toil up the slopes, lie towns which are still market-towns, two of which were formerly much more important than they are to-day. *Watford* commands the approach to the Berkhamsted Gap. Its nearness to London, and its good land and water communications (road, railway, canal) have made it a rising manufacturing centre. The cathedral city of *St. Albans* commands the approach to the Luton Gap, and *Hertford* lies near the main approach to the

## *Gaps and Gap-Towns*

Stevenage Gap; both are market towns, which are less important to-day than they were. Connecting all three—Watford, St. Albans, and Hertford is an important transverse road along the foot of the chalk uplift, and a transverse railway system.

The Great Central Railway leaves the Thames Basin by the *Wendover Gap* (430 feet), and passes down into the Vale of Aylesbury.

The Great Western Railway has two main passages—(1) the chief, through *Reading* and the *Goring Gap* (by which the Thames enters its lower basin); and (2) through the *High Wycombe Gap*, at the northern end of which stands Princes Risboro', whence lines branch in three directions, (1) to Oxford, (2) to Brackley; and (3) to Aylesbury. Princes Risboro' is thus an excellent example of the convergence of traffic-routes in order to pass through a gap.



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FIG. 16.—THE WEALD AND THE HAMPSHIRE BASIN



## THE WEALD AND THE HAMPSHIRE BASIN

**T**HE Weald and the Hampshire Basin are the two southernmost of the fertile basins which lie within the English Scarplands. Their general structure and their relationship to the great chalk ridges running eastward and southward from Salisbury Plain will be clear on reference to the diagram.

The Weald has a structure peculiarly its own. The Hampshire Basin is very similar to the London Basin.

### THE WEALD

At the present day the Weald is a *basin* bounded by the North and South Downs, and tilted gently towards the south-east. Its shape is roughly that of a horse-shoe.

Long ago, where the Wealden Basin now lies, there rose a vast chalk ridge, with a rounded dome, which we are told must have been at least 3,000 or 4,000 feet high. Down its sides streams ran to the Thames on the north, and to the English Channel on the south. Beneath the chalk layer were others—the gault, the greensand, etc. When this great dome-like ridge was weathered and broken down by the action of streams, it took the form which it has to day. The North and South Downs are parts of the old chalk ridge, and now appear as two separate ridges, with their steep slopes facing each other. Between them the chalk and much of what lay beneath it have been worn away, leaving here and there the harder rocks standing up as minor ridges within the Weald itself. (Sections across the Weald are to be found in most good text-books of the British Isles, and need not be repeated here. Teachers should reproduce these sections on the blackboard, and

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refer to them during their explanation of the changes which the Weald has undergone.)

*Weald* is a Saxon word meaning 'forest.' The Saxons called it 'Anderedes Weald,' which was their way of translating the Roman name for it—*Anderida Silva*. *Silva* means a 'wood' or a forest. In Roman and Saxon times the whole region was filled with forest, and to-day as one crosses the Weald one gets glimpses of pretty woodlands, which are all that remain of the thick forests which grew there in the Middle Ages.

The most important share of the Wealden drainage passes to the Thames and its estuary. Smaller streams, like the Arun, Adur, Ouse, and Rother, drain to the English Channel; while the Kentish Stour drains to the North Sea by the Isle of Thanet.

Within the Weald itself lie two clay troughs running east-west, and separated from each other by a sandstone ridge, known as Forest Ridges.

### INDUSTRIES OF THE WEALD

In very early times the Weald had a flourishing iron-smelting industry. The sandstone yielded plenty of iron, and the forests yielded charcoal wherewith to smelt it. Later, this region provided most of the iron used in England. But when men began to use coal for smelting, and when the Industrial Revolution came about the iron-smelting industry passed from the Weald to the coalfields of the English Midlands and the North. A population map of England in the eighteenth century shows a far greater density of population in the South-East of England than in the Midlands and the North. A population map of to-day shows very dense population on the great coalfields. The reason is obvious.

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There are still small foundries in various parts of the Weald where this ancient industry is kept alive ; and in many places traces may still be seen of the big fires of the old charcoal burners.

Though the Weald is no longer a great iron-smelting area, a new future may lie before it when the new coal mines of Kent begin to yield their promise. Several bores have been made, and the coal is already being got ; it lies at a great depth, however, and is expensive to mine. The only profitable ' mining industries ' to-day in this region are of building stone, sand, clay for bricks, fuller's earth (near *Redhill*), gypsum (near *Battle*), and, of course, chalk.

The main industry of the Weald is agriculture and stock-rearing. Kent is so fertile that it is called ' The Garden of England ' ; and the qualities of South Down mutton testify to the success of the sheep-rearing on the chalk Downs of Sussex.

Kent is famous for its hops, as well as for fruits of all kinds. Everywhere are orchards and hop-gardens, and everywhere the conical roofs of the ' oast-houses,' or kilns, in which the hops are dried on wire netting above a furnace, peep out from trees and villages nestling in the fertile hollows. June brings the strawberries, July the cherries, August the plums, September the hops, October and November the apples and pears ; so that the fruit gathering goes on continuously in this fertile region for nearly half the year. In the Garden of England soil is mixed and rich, and there is plenty of sunshine, and not too much rain. That is why fruit-growing is so profitable there.

### THE WEALDEN TOWNS AND THE COAST

As may be expected, the chief towns are nearly all market towns, situated at points where many routes

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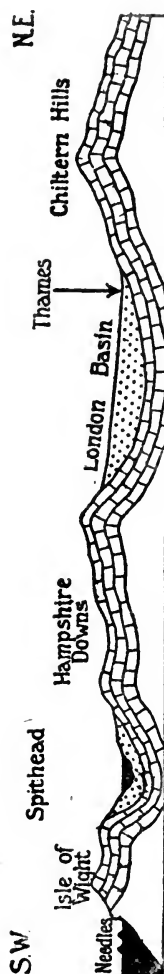


FIG. 17.—SECTION ACROSS ISLE OF WIGHT, THE HAMPSHIRE BASIN, AND THE LONDON BASIN, SHOWING THE CONNEXION OF THE THREE IN RELATION TO THE CHALK RIDGES

## *The Weald and the Hampshire Basin*

meet. Most of them lie at gaps in the chalk Downs, as we pointed out in our last chapter. Examples are *Guildford*, *Dorking*, *Reigate*, *Sevenoaks*, and *Maidstone* in the North Downs, and *Arundel* and *Lewes* in the South Downs. Some of these gaps, as we have already shown, were strongly fortified, and the castles still standing at Guildford, Arundel, etc., show how important the Normans considered these passages.

Most of the villages are situated where springs well up between the chalk and the gault, for a good supply of water is necessary to human life.

*Canterbury*, just outside the Weald, stands in the Stour Gap of the Downs at the cross-roads between Dover and London, and Ashford and Thanet. It was the old capital of the Kingdom of Kent, and its cathedral is the oldest in England. The Archbishop of Canterbury is the head of the Church of England.

*Maidstone*, on the Medway, is another focus of routes from Rochester and Chatham, from London, from the Weald, and from Rye and Dover on the south-east coast.

Outside the Weald—on its outer rim, so to speak—lie several important towns. Most of them are well-known seaside resorts, like *Margate*, *Deal*, *Ramsgate*, *Broadstairs*, *Folkestone*, *Hastings*, *Eastbourne*, *Brighton*, *Worthing*, etc. But in the north-east, at the mouth of the Medway, lie the important naval centres of *Sheerness*, and *Chatham* (with Stroud and Rochester), which form an important part of the London defences. *Dover*, too, is a great naval port, thanks to the enormous artificial harbour which has been constructed there. (Why should Dover be strongly defended?)

Trace the main lines of the S.E.C.R. and the L.B.

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S.C.R. Notice particularly the ferry-towns for the Continent :—

*Queenborough* (Sheppey), for Flushing and Antwerp.

*Dover*, for Calais, Dunkirk, and Ostend.

*Folkestone*, for Boulogne,

*Newhaven*, for Dieppe.

Look up time-tables and see how long it takes to reach these towns from London, and which are the chief stations *en route*.

### THE HAMPSHIRE BASIN AND THE ISLE OF WIGHT

This region, like the London Basin, is a shallow basin in the chalk, filled with clays and sands. The diagram which appears on this page explains clearly the connexion of the Hampshire Basin and the Isle of Wight with the London Basin. Spithead lies where the sea has worn away a huge belt of chalk and the softer rocks beneath it, which ages ago joined the Isle of Wight to the mainland. The famous *Needles* off the western end of the Isle of Wight are masses of chalk which have been cut off in similar fashion.

To the west of the basin lies the equally famous *Chesil Bank*, a long shingle-spit built up by the tidal currents to join the island of Portland to the mainland. It is a sort of natural groyne. Sheltered by it is the watering-place and naval harbour of *Weymouth*.

Industries are mainly agricultural, like those of the Weald. Sheep are reared on the Hampshire Downs, cattle in the lowlands; hops, fruit, grain, and root crops on the arable land. *Salisbury*, *Winchester*, and *Dorchester* are typical market-towns; the two former have famous cathedrals. *Winchester* is famous, too, for its history as the former capital of England and its association with Alfred the Great. Rufus, the Red

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King, who was slain in the New Forest, lies buried beneath its tower.

But the greatest centre of life is the shore, Southampton Water and Spithead. *Southampton*, which has the advantage of four tides a day, and thus has never really 'low water,' is a great port, especially for trade with South Africa. *Portsmouth*, with Gosport and Southsea, is our greatest naval station and naval dockyard.

From Portsmouth there is regular steamer communication with *Ryde* and *Cowes* in the Isle of Wight, which is famous for its delightful climate, and for its many pretty watering-places, e.g., *Ventnor*, *Sandown*, and *Shanklin*.

## SOUTH-WESTERN ENGLAND

**S**OUTH-WESTERN England consists of the long peninsula which stretches out into the Atlantic, and includes the lands which lie south and west of the Mendips.

### SURFACE RELIEF

The most conspicuous features on the map are the limestone tableland of the *Mendips*, the granite mass of *Dartmoor*, and the sandstone uplands of *Exmoor*. West of Dartmoor across the Tamar Valley rises the rounded granite hump of *Bodmin Moor*.

Among these lie broad fertile plains and valleys, of which the most important are :—

(1) *The Plain of Somerset*, between the Mendips and the sandstone Quantocks, drained by the *Parret*.

(2) *The Vale of Taunton*, between the Quantocks and the Blackdown Hills, drained by the *Tone* (a tributary of the *Parret*).

(3) *The Devonshire Plain*, between Dartmoor and Exmoor, drained northward by the *Torridge* and the *Taw*, and southward by the *Exe*.

(4) *The Valley of Tamar*, between Dartmoor and Bodmin Moor, drained by the *Tamar*.

The *Mendips* rise deeply above *Sedgemoor*, the eastern half of the Plain of Somerset. Their high limestone crags, deep gorges, mysterious caverns, and underground rivers are very much like those of the Peak District, which is also of limestone formation. The most famous spot in the Mendips is the Cheddar Gorge, which is held by the best authorities to have been once a long subterranean cavern formed by an underground river. Later, the roof of this cavern



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fell in, leaving its floor open to the sky and the weather, and forming the Gorge. In the gorge itself are the entrances to two series of interesting caverns, with underground streams and lakes, and wonderful stalactitic and stalagmitic formations. The caverns in the limestone are formed by the action of running rain-water, which easily dissolves away limestone; the stalactites from the roofs and the stalagmites on the floors of the caverns are formed by the gradual re-deposit of carbonate of lime where the water (containing it in solution) drips through and evaporates.

*Sedgemoor* is the Fenland of the West Country. Like the Fens, it is low lying, it consists of alluvial deposits brought down by rivers, and it is now very much drier, owing to careful drainage, than it formerly was. Sluggish rivers meander across it, and countless drainage channels intersect it like a close net-work.

Sedgemoor is renowned in legend and story. The high hill of Glastonbury Tor is said to have been the Island of Avilion, where King Arthur, after his last great fight, went to die. Athelney, the island refuge of Alfred the Great, reminds us of his ceaseless warfare with the Danes. It reminds us, too, of another 'isle'—the Isle of Ely, the stronghold of Hereward the Wake. Here, too, was fought the Battle of Sedgemoor, in which the ill-fated Monmouth was defeated by the army of James II in 1685.

*Dartmoor* is a great 'island' of granite, rising above the surrounding slates. The granite has weathered here and there into great oblong blocks all cracked and seamed by rain and wind. The heights on the moor are called 'Tors'; and in at least two cases—*Yes Tor* and *Great Links Tor*—rise above 2,000 feet. In many places throughout the granite region of the south-western peninsula the granite has become

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so decomposed by exposure to weather for long ages that the felspar in it has broken down into the fine clay, which is known as 'china clay,' or *Kaolin*. The moors are very wet and boggy, especially where this stiff clay in the hollows holds up the water.

*Exmoor* looks out over the Bristol Channel, and reaches a height of over 1,700 feet in Dunkery Beacon.

### CLIMATE AND AGRICULTURE

The south-western peninsula has the most equable climate in England. So mild are its winters that it almost deserves its picturesque name of 'The English Riviera.'

The figures below serve to show the contrast between the climate of Cornwall and that of Eastern England. The contrast becomes more apparent if curves be drawn for temperatures and block diagrams for the rainfall.

PLACE.	MEAN TEMPERATURE (F.°)											
	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Falmouth . . .	43	44	44	48	52	57	60	60	57	52	48	45
Yarmouth . . .	37	38	40	44	50	56	58	60	57	49	44	39

PLACE.	MEAN MONTHLY RAINFALL (INCHES).											
	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Penzance . . .	5.8	4.1	3	2.8	2.1	2	2.7	3.2	3.8	5.1	4.9	5.4
Lowestoft . . .	1.8	1.8	1.7	1.7	1.8	1.6	2.7	2.2	2.7	2.1	3	2.6

From the temperature figures it is clear that Yarmouth has a greater range of temperature (23 deg. F.) than Falmouth, which has a range of 17 deg. F. The rainfall, however, of Penzance is very much heavier than that of Yarmouth. This illustrates the rule,

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'the greater the range the less the rainfall, and vice versa.'

South-Western England is almost surrounded by warm sea, so that its winters are warmer than anywhere else in England, and its summers are cool, thanks to the sea breezes. The prevailing westerlies bring warmth and moisture from the North Atlantic, and the highlands of the peninsula help in the precipitation of rain.

The general mildness of the climate renders this region a safe refuge for invalids who dread the winter cold. The rich soil and genial weather make it a fertile garden where fruits and flowers and vegetables can be grown to perfection earlier in the year than in any other part of the British Isles, for spring frosts are rare. From Cornwall, and especially from the Scilly Isles, come our earliest home supplies of early potatoes, radishes, lettuces, broccoli, and spring flowers.

The rich soil of Eastern Devon and Western Somerset enables large quantities of apples and other fruit to be grown. Devonshire cider is world-famous. So is Devonshire cream—for the rich pasture in the valley-bottoms of both Cornwall and Devon supports large numbers of fine cattle. Cheddar cheese is made from the milk of cattle grazed on the Plain of Somerset. The whole region is mainly agricultural, and agriculture in one form or another is by far the most important occupation of the people.

### COASTLINE, HARBOURS, AND FISHERIES

Almost everywhere the coastline shows signs of subsidence. Along the south coast the sinking of the coastline has let the sea far up deep valleys, forming the splendid harbours of Dartmouth, Plymouth, Falmouth, and Fowey. Farther west the

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Scillies stand waist deep in the sea—the visible remnants of the ancient land of Lyonesse now sunk beneath the ocean.

In many places the land falls steeply to the sea, and to sheltered beaches in the high, bold cliffs which add greatly to the grandeur of Cornish coast scenery.

Such a coastline as this, with fine, deep natural harbours and hundreds of sheltered bays and coves, breeds a race of hardy fishermen and sailors. Every boy and girl has heard of the exploits of the 'Sea Dogs of Devon'—of Drake and Hawkins, of Raleigh and Gilbert, who sailed from the harbours of Devon and Cornwall to hunt treasure ships upon the Spanish Main, or to sail long and lonely voyages in search of new lands.

Fishing is naturally an industry of great importance in South-Western England. Great shoals of pilchards and mackerel visit the coasts, and fleets of boats, especially out of *St. Ives*, *Penzance*, *Newlyn*, *Plymouth*, and *Megavissey*, take heavy toll of them. *Brixham* is famous for its trawlers; so are *Plymouth*, *Newlyn*, and *Falmouth*. In some years the value of the fish caught at *Newlyn* alone is more than a third of that for the whole of the South Coast of England.

Many charming holiday resorts nestle in the quiet coves and bays of Cornwall and Devon. Larger centres are *Torquay*, the 'English Naples,' on Tor Bay; *Penzance*, on Mounts Bay; and *Ilfracombe*, in North Devon.

*Plymouth* is the great naval station which commands the Channel entrances. With its 'suburbs' of Devonport and Stonehouse it is the biggest town in South-Western England, and an important railway centre. Two main lines converge upon it, the Great Western and the London and South-Western. (Note that the

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London and *South-Western* goes *north* of Dartmoor from Exeter to Plymouth.) Homeward-bound liners call at Plymouth to land mails, which are forwarded by train to London, thus saving many hours. Some miles out from Plymouth is the famous Eddystone lighthouse, built on a reef of dangerous rocks which lie right in the fairway from the Lizard to the Start.

### OTHER INDUSTRIES

Besides agriculture and fishing, mining and some manufactures are carried on.

The earliest history of Britain is concerned with the visits of Phœnicians, and certainly of Greeks and Romans, to the south-western peninsula for tin and copper. The ancient workings of primitive miners abound in many places, but most of the very valuable deposits have long since been worked out. A considerable amount, however, is still mined. Tin, copper, zinc, lead, and tungsten ores occur in veins in the slates and granite. The richest mines are in the St. Ives and Camborne regions. Tavistock, in Devon, has copper mines, and in the basins of the Tamar and Teign there are lead mines.

Lead is still obtained in the Mendips, where the mines have been worked almost continuously since Roman times.

Granites and slates for building purposes are extensively quarried. More important still is the famous kaolin, or 'china clay,' which is exported from Fowey and Teignmouth, not only to the Mersey for use in the Potteries, but to many other parts of the world. The clay is used, too, in the making of paper on which good pictures are to be printed, and in the manufacture of cottons.

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Manufactures are few. *Honiton* is famous for its lace and carpets; *Hayle* has boiler works, and makes explosives for use in the mines.

Since agriculture is the chief industry, most of the inland towns are market centres. *Taunton* is the natural centre of the Vale of Taunton, as well as an important railway town. *Bodmin*, county town of Cornwall, is another market centre. *Truro* and *Redruth* are mining towns.

*Exeter* is the natural gateway from the sea into the most fertile part of Devon and Somerset. As its name suggests, it is an old Roman town. *Wells*, in Somerset, in the shadow of the Mendips, has one of the most beautiful cathedrals in the world.

## THE SEVERN BASIN

THE Severn rises near Plynlimmon, less than twenty miles from the waters of Cardigan Bay ; but it flows eastward, and in a great bend along the edge of the Welsh Highlands it passes through the western side of the English Midlands, and enters the Bristol Channel.

### MAP STUDY

Notice first that the valley of the Upper Severn provides the chief natural means of entry into the middle of Wales. Guarding this natural approach is the old fortress-town of *Shrewsbury*. The northern edge of the Severn Estuary is the coast-plain which is the main entry into South Wales from England, as the number of castle-towns guarding the way abundantly testifies — note particularly *Gloucester*, *Chepstow*, and *Cardiff*.

The upper valley forms a deep cleft between the Berwyn Range and the Mynydd Bach group of the Welsh mountains. Follow the river from its mountain origin to its exit upon the fertile plain of North Shropshire.

Past Shrewsbury, the river turns south through a gorge between the South Shropshire Hills and The Wrekin, emerging upon the plain of *Worcester*. Its course is now slow. The river winds across the plain in swinging meanders until finally it enters its estuary. Summarising, we have :—

- (1) *Vale of Powis*—the upper valley of Severn.
- (2) *Plain of Shrewsbury*.
- (3) *Severn Gorge*, between the volcanic Wrekin and Wenlock Edge (of the South Shropshire Hills).
- (4) *Plain of Worcester and Gloucester*.

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Several large tributaries are worthy of special note. They are :—

(1) *The Warwick Avon*, flowing through the fertile Vale of Evesham, between the Forest of Arden and the Edge Hills.

(2) *The Teme*, a right-bank feeder from the Clun Forest of Wales.

(3) *The Wye* from the Mynydd Bach, noted for its limestone, beautiful gorges, and magnificent scenery (especially near Tintern Abbey).

(4) *The Usk* and the *Taff*, from South Wales.

(5) *The Bristol Avon*, with its wonderful Clifton Gorge and its great harbour at Avonmouth.

### CHIEF TOWNS AND INDUSTRIES

The upper valley has excellent sheep pastures, which were the original cause of the woollen industries (especially in flannels) of places like *Welshpool*, which is also a market town, as are most towns of any importance in this region.

*Shrewsbury* is an ancient stronghold built, like Durham, within a convenient loop of the river. Nowadays, it is a great railway centre, standing, as it does, at the crossroads (1) north and south between Bristol and Liverpool, (2) east and west between Birmingham and Wales. It is also a main focus of roads in the west of the Midlands, and thus a natural market town.

Beyond Shrewsbury, and to the south lies *Coalbrookdale*, with its small coalfield, on which the first experiments in using coal for iron smelting were



## *The Severn Basin*

successfully carried out. Fine china is made here. Farther down stream is the carpet-weaving centre of *Bridgnorth*.

The little Stour comes in on the left bank from the Black Country ; in its valley are *Stourbridge*, famous for pottery ; and *Kidderminster*, for carpets.

In the Plain of Worcester lies the cathedral city, which is famous for its gloves and porcelain. Some miles from the main stream and to the north-east of Worcester are the salt deposits of *Droitwich*, which is used in glazing Worcester china.

Some miles south of Worcester the main river is joined by the Warwick Avon from *Stratford* (Shakespeare's birthplace), and the fertile Vale of Evesham (famous for fruit-growing). In the upper Avon valley are *Warwick*, with its famous castle and old Tudor houses, and the health resort of *Leamington*, whose valuable mineral springs attract large numbers of visitors.

On the western edge of the Plain of Worcester rise the steep Malvern Hills, at whose foot lies the health-resort of *Malvern*. With Leamington and Malvern we may associate *Cheltenham* at the foot of the Cotswolds—also famous for its mineral springs.

### THE LOWER BASIN AND ITS CENTRES

From Stourport, where the little Stour joins the Severn some miles above Worcester, down to Gloucester the main river is controlled by a lock system. The river is, in fact, canalised. South of Gloucester the Severn Ship Canal has overcome many of the natural disadvantages of the river—it cuts across the windings, for example, thus saving a good deal of time. But it does not admit large vessels.

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*Gloucester* occupies an important position at the lowest bridging-point of the Severn, and at a point which controls the approaches to South Wales. The Romans recognised the value of the site, and the name *Gloucester* bears witness to the fact that the Romans had a strong city there. (Compare also *Worcester*.) But although *Gloucester* is important as a route-centre and as a cathedral city, it is not of any very great account as a port. Yet it is situated at the head of what looks on the map to be a fine estuary.

*Gloucester* has not become a first-rate port in spite of its convenience for the busy industrial centres of the Midlands, and in spite of its ship canal between Sharpness and *Gloucester*. It suffers greatly from the disadvantages of the river and its estuary. The Severn estuary, like other funnel-shaped estuaries on continental platforms, is subject to great tidal range. At Chepstow, for instance, there is a difference at spring tides of over sixty feet between high and low water. There is also the Severn *bore*, which is not dangerous, but inconvenient. The tidal wave advancing up the funnel-shaped estuary cannot move on as it should, but piles up water until the upper layer rushes forward upstream like a low wall in motion. The bore hinders navigation, but the great tidal range is much more serious; and until enormous docks are built to hold back the water when the river falls no large vessels can be berthed above Avonmouth.

A good deal of grain and timber go up to *Gloucester*, however, whence they pass by canal-boat up the Severn, and along the Stratford and Worcester Canal to the Potteries and the Black Country.

The Great Western Railway negotiates the Severn estuary by means of the famous Severn Tunnel between Pilning and Portskewett. The following are

## *The Severn Basin*

useful facts relating to this well-known triumph of engineering :—

Built by Charles Richardson.

Opened on September 1, 1886.

Total length : 4 miles 524 yards.

Length of approaches : 2 miles.

Depth be'ow high-water level : 170 feet.

Height of arch above rails :  $24\frac{1}{2}$  feet.

Width of tunnel : 26 feet.

The distance from Newport (Mon.) to Bristol by way of Gloucester is  $80\frac{1}{4}$  miles ; via the Severn Tunnel, only  $26\frac{1}{4}$  miles ; via Swindon  $122\frac{1}{4}$  miles.

### THE BRISTOL AVON

Though but an insignificant river, the Bristol Avon has played, and still plays, an important part in British commerce. *Bristol*, some distance from the mouth of the river, is still a city of great importance, but the bulk of its sea-borne trade has passed lower down the river to its outpost at *Avonmouth*, where there are docks capable of berthing the largest liners ; as well as a complete system of transport and warehousing.

*Bristol* grew up at the bridge point (Brigstow—bridge place), where ships landed their goods in mediæval times, trading between Bristol and Ireland, or Bristol and France. It was from Bristol that the Cabots set sail in the little *Matthew* (1497) on their voyages of discovery ; from Bristol, too, which was conveniently situated for trade with the New World, the *Great Western* made the first steamer trip across the Atlantic. Bristol became well known as the port for produce from the Americas and the West Indies ; and to this day Bristol's fortunes largely depend on the sugar, tobacco, cocoa, leather, oil, and paper pulp

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imported from the Americas. It has the good fortune, too, to be on the edge of the small Bristol coalfield, which supplies fuel for its factories.

At *Avonmouth* several important lines of steamships have their berths, notably those of the Royal Mail Steam Packet Company, which ply to the West Indies, Central America, and South America.

Between Bristol and Avonmouth is the beautiful Avon Gorge, spanned by the Clifton Suspension Bridge in one splendid span of 702 feet.

Bristol has cocoa and chocolate factories, leather factories, tobacco factories, sugar refineries, and tanneries. Avonmouth's chief feature is its huge import of bananas and other fruits from the West Indies and Central America.

## WALES

THE land of mountains that thrusts its solid block out westwards beyond the line of Severn and Lower Dee is called by its people *Cymru*—‘Land of Brothers’; and by those who dwell beyond its borders, *Wales*—‘Land of Strangers.’

### MAP STUDY

The Welsh Principality is filled with mountains from the Irish Sea to the Bristol Channel, save for narrow coastal plains.

At first sight this confused highland mass is difficult to understand. Careful examination, however, enables us to distinguish the following masses :—

(1) *The Snowdon Range*, and Snowdonia, with the sunken rift of the Menai Strait at its north-western foot, and the cleft of the Vale of Conway on the East.

(2) *The Berwyn Range*, separated from Snowdonia by the Vale of Bala and the Upper Dee.

(3) *The Plynlimmon Group, the Mynydd Bach, and the Clun and Radnor Forest Masses*, separated from the Berwyn Range by the Vale of Powis—the valley of the Upper Severn.

(4) *Brecon Beacons and Black Mountain*, separated from the Radnor Forest Mass by the Vale of Brecon, which is partly the valley of the Upper Usk, and partly the valley of the Upper Wye. Notice, too, that Brecon Beacons are separated from Black Mountain by the Gap of Usk, followed by the Brecon Canal, which links Brecon with the port of Newport in Monmouth.

The most important areas of *Plain-land* are (1) the Island of Anglesea, which has only one hill more than 500 feet above sea-level, and whose fertility once won

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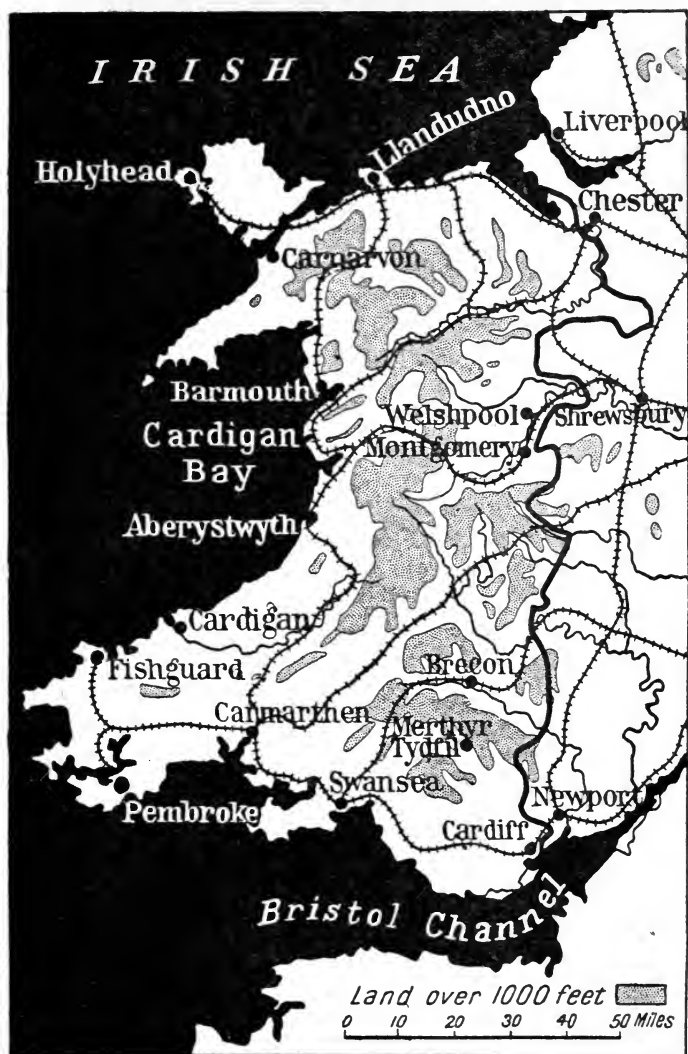
for her the name of 'Mother of Wales'; and (2) the wide coastal plain along the shores of the Bristol Channel (Plain of Gwent).

The most important of the *rivers* that rise in Wales have their lower courses outside the Principality—the *Dee*, which flows through the Vale of Bala down to the Cheshire Plain; the *Severn*, which rises in the Plynnimon Group that flows through the Vale of Powis to the Shropshire Plain; and the *Wye* and *Usk*, which flow into the Severn estuary. The longest 'all-Welsh' rivers are those which rise on the slopes of the Mynydd Back (*Teifi* and *Towy*), or in the Brecon Beacons (*Neath* and *Taff*).

### THE WELSH MOUNTAINS

The Welsh Mountains are formed of very old rocks. Although the regular alternation of ridge and valley suggests folding, the mountains have been carved out of an ancient plateau by streams. Such mountains are often called 'residual mountains.' The mountains of the Scottish Highlands and of the English Lake District have resulted from the same process—the gradual dissection of ancient highland plateaux by running water. This becomes clearer to the observer when he stands on one of the peaks or tops of the ridges so that he can see far in every direction. He notices then a general similarity of level among the most important 'ranges' and high peaks.

Like the Scottish Highlands and the mountains of the English Lake District, the Welsh Mountains show abundant signs of former glaciation. In the Snowdon area, particularly, such evidences are common. Here one can see great stretches of smoothed and polished rocks, with long lines of deep grooves and scratches following the direction of the moving ice as the glacier



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FIG. 18.—WALES

## *Geography of the Homeland*

slid over them in the days before human history began. In some of the passes—e.g., in the Pass of Llanberis—lie huge blocks of stone altogether unlike any of the rocks in the neighbourhood. Such rocks have been brought from considerable distances by the moving glaciers; they are called ‘erratics’—wandering stones.

Many of the lakes owe their origin to the Great Ice Age. *Bala*, for example, has been formed by the building up of a morainic and erratic dam across the valley by the retreating ice. Many of the small lakes (‘llyn’) of Snowdonia are rock-basins gouged out by the glaciers.

Lake *Vyrnwy* in the Berwyn Range is an artificial lake made by the construction of a dam across a tributary of the Severn. It forms a valuable artificial reservoir, and supplies the City of Liverpool with drinking-water. Other artificial lakes in the Wye system (Claerwen and Elan) provide Birmingham with a good water supply.

### THE MOUNTAINS AND HISTORY

The geography of Wales has, to a very large extent, determined its history. ‘Its mountains,’ says Sir Owen Edwards, ‘explain its isolation, and its love of independence; they explain its internal divisions; they have determined, throughout its history, what the direction and method of its progress were to be.’

Wales has always been a land difficult to conquer. To the refuge of its mountains fled the old pre-Keltic peoples before the advancing waves of Kelts; thither, in their turn, fled the Kelts themselves before the power of the Romans, and, later, before the fierce land hunger of the Saxon pirates from overseas. In Wales have been kept alive a national feeling and a



## Wales

national language that go back to the dawn of British history. Only in the coastal lowlands have English people settled in any numbers.

But, as has often been pointed out, the very difficulty of the country, which made it a refuge and a stronghold, prevented any strong political union among its tribes. 'There is no central point upon which paths and roads could converge; Wales never had a capital.' Even to-day 'the favourite meeting-place for conferences of persons from all parts of Wales is *Shrewsbury*—a town outside Wales, but more easily reached from all parts of Wales than any town within its boundaries.'—*Morley Davies*.

The mountain fastnesses of Wales were reached by the first Edwards and by other invaders along four great natural approaches—(1) Along the northern coast plain; (2) along the plain of Gwent; (3) by way of the Upper Severn Valley; and (4) by way of the Upper Wye Valley. Along all these routes lay the great castles constructed by invaders and conquerors, first to aid in the work of conquest, and then to serve as strongholds to keep the Welsh in subjection.

The Romans made roads along both north and south coastal plains. Deva (*Chester*) was the key to the north, and Isca Silurum (*Caerleon*) the key to the south; while Uriconium (near *Shrewsbury*) guarded the approaches to mid-Wales by way of the Upper Severn.

The Normans built castles at Chester, Flint, Harwarden, Rhuddlan, and Deganwy in the north; and at Chepstow, Newport, Cardiff, Swansea, Kidwelly, and Pembroke in the south—to name only the most important. Hereford Castle guarded the Wye, and Shrewsbury the Severn. Edward I added to these; but all were grouped along the same main approaches.

# *Geography of the Homeland*

## MOUNTAINS AND RAILWAYS

Wales affords an excellent illustration of the way in which 'roads follow the valleys.' The two main railways into Wales are the London and North-Western, from Crewe to Holyhead (packet station for Ireland); and the Great Western, by way of the Severn Tunnel, Chepstow, Newport, Cardiff, and Swansea to Pembroke and Fishguard, the South Wales ferry-port for Ireland.

There are local lines which follow the valleys and penetrate into the heart of the Principality. Of these the most important are those from Shrewsbury via Welshpool to Aberystwyth, from Chester via the Dee Valley to the coast of Cardigan Bay, and from Carmarthen through Radnor Forest to Shrewsbury.

## CLIMATE

Wales lies on the western side of the southern half of the island of Great Britain. Much of its surface is high, and steep rises face the moist and prevalent westerly winds, which bring warmth in winter and cool air in summer from the North Atlantic.

The more important results of this are :—

(1) Wales in the lowlands and on the west coast is warmer in winter and cooler in summer than parts of England in the same latitude.

(2) In winter the Welsh coast is at least three degrees warmer than the coast of Lancashire, and is just as cool in summer, although it is farther south.

(3) Wales has no great range of temperature except in the higher regions. The range for the coast of Cardigan Bay is about nineteen degrees, and for western Pembroke less than eighteen degrees. (Contrast this

## *Wales*

with the range for East Anglia, twenty-four degrees in the same latitude.)

(4) Wales has an exceptionally heavy rainfall, especially in the Snowdon and Berwyn districts, and in Brecon. On the coast of Cardigan Bay the rainfall is about forty inches ; but on the slopes of Snowdon it rises to 200 inches, the heaviest rainfall recorded in the Homeland (*Seathwaite*, in the Lake district, is the wettest inhabited town).

(5) The coast around St. David's Head, and the entrance to the Bristol Channel, are subject to frequent dense fogs, especially in spring and summer.

(6) Wales has far less sunshine than East Anglia or the South Coast of England. East Anglia has, on the average, over 1,800 hours' sunshine during the year, while the coast of Cardigan Bay has little more than 1,400. The Welsh interior has between 1,300 and 1,400 hours' sunshine ; cloudy weather is common because of the highlands and the prevailing wet westerly winds.

Study carefully the temperature charts in preceding pages, and notice how Wales compares in respect of temperature conditions, with other regions of the British Isles.

### AGRICULTURE AND STOCK-BREEDING

The mountainous character of the country, the heavy rainfall, and the severity of the winters upon the mountains, together with the poor soil, lead us to expect that comparatively little land in Wales is under cultivation.

Profitable agriculture is possible only in Anglesey and in the rich alluvial soil of the river valleys. The

## *Geography of the Homeland*

following figures are worth consideration in this connexion :—

COUNTRY.	—— 100,000 Acres. ——	
	Total Area.	Arable Land.
Wales . . . . .	47	.... 7
England . . . . .	324	.... 103

About a third of the surface of England is plough-land, but in Wales less than a sixth is capable of good cultivation.

Welsh farms are very small; in 1912 about one-sixth of the total number of holdings were less than five acres in extent, and agriculture in the Principality is, generally speaking, much more backward than anywhere else in Britain.

Comparatively little wheat is grown, for the climate is too damp; but oats, roots, and barley do well, though Wales does not produce anything like the crops in England, proportional to its area.

Stock-breeding is an important industry. Sheep flourish on the mountain pastures, and cattle in the plain-lands of Anglesey, and the coastal plains. Dairy farming is a profitable occupation, and Welsh cheeses are justly famous for their richness. Wales rears nearly as many sheep as Ireland; the wool supplies the raw material for the flannel manufactures of the upper Severn valley. Welsh ponies are reared in South Wales.

### MINING

Wales is rich in mineral wealth. The coalfields lie mainly along the eastern borders. By far the most important is the *South Wales coalfield*, which in 1912 stood third in the list of British coal-producers; it yielded more than one-sixth of the total coal produced

## *Wales*

in the Homeland during that year. Several kinds of coal are mined, and before the war a very large export trade in coal was carried on at the outlet ports of Cardiff, Swansea, and Newport. Cardiff stood first in coal export among British ports in 1912, and Newport third. The coalfield of Pembroke is really a western extension of the South Wales coalfield; but as yet it is not so skilfully and so scientifically worked.

The richness of the South Wales coalfield has attracted several flourishing industries, especially iron-working and tin-plating, and the area is consequently by far the most densely populated in Wales. It is fortunate in its natural highways, for several rivers (notably the *Taff* and the *Tawe*) intersect the coalfield, cutting deeply into the coal measures, and thus making it easy to get at the coal, and at the same time providing natural routes for the conveyance of the coal to the coastal regions. (Study the railways of South Wales, and notice how faithfully they follow the valleys.)

Other coalfields along the Welsh border are the *Forest of Dean coalfield* (really a detached block of the South Wales coalfield) and the coalfields of *Flint and Denbigh* in the north-east of the Principality.

Iron occurs in large quantities on the South Wales coalfield, but the smelting and iron-working industry at *Merthyr Tydvil, Swansea, Cardiff, Newport, Dowlais*, and other South Wales centres, has assumed such vast proportions that a great deal of iron ore is imported, especially from Bilbao, in Spain. Large quantities of copper and tin ore are also imported to feed the smelters of the big coast towns. Iron is also found on the *Forest of Dean coalfield*; its iron industry is very old, and is specially mentioned in the *Domesday Book*.

Rich veins of lead are found in North and Central

## *Geography of the Homeland*

Wales, and some gold is mined in the *Dolgelly* district. The copper mines of Anglesey were formerly of very great importance; the chief deposits now worked are near *Amlwych*. Manganese and zinc are also found.

Wales is famous for slate and building stone. The main slate quarries are at *Bethesda* and *Llanberis* in Carnarvonshire, whose export outlets are *Bangor* and *Carnarvon*.

### OTHER INDUSTRIES

Fishing is carried on at numerous harbours along the coast. The most important fishing centre is *Milford*; *Swansea* comes next, and *Cardiff* third.

A very important Welsh industry is the 'tourist industry.' The magnificent scenery of the Welsh mountains, and the many delightful coast resorts which have the double advantage of healthful sea air and nearness to beautiful mountain scenery, attract many thousands of visitors every year. The Welsh holiday resorts are within easy reach of the teeming millions of busy workers in the English Midlands and South Lancashire, and prosperity in these latter regions is reflected in Wales. Among the more noteworthy of Welsh holiday resorts are *Llandudno*, *Rhyl*, *Colwyn Bay*, *Bangor*, *Beaumaris*, *Aberystwyth*, *Barmouth*, and *Aberayron*. The busy South Wales area has its holiday resorts in *Tenby* and the Gower Peninsula.

### CHIEF TOWNS

Most of the great Welsh towns have already been mentioned in connexion with the mining and metallurgy. *Swansea* is the chief metal smelting centre. Originally it smelted copper and tin ores from Cornwall and Devon, but these have long since failed to meet its demands, and large quantities of copper, nickel, and

## *Wales*

tin from mines all the world over are imported. The tin-plate industry is concentrated here.

The chief outlet ports for the coal of the South Wales coalfield are *Cardiff*, *Swansea*, *Port Talbot*, *Newport*, and *Llanelly*. The greatest ironworks are at *Merthyr Tydvil*, *Ebbw Vale*, *Dowlais*, *Rhymney*, and *Tredegar*.

*Wrexham* and *Ruabon* are the chief towns of the Flint and Denbigh coalfield. *Newtown* on Severn is the chief centre of the Welsh flannel industry. *Welshpool* is an important railway centre and market town.

*Pembroke*, on the splendid harbour of Milford Haven, has an important naval dockyard. *Fishguard* is the G.W.R. ferry town for Rosslare in S.E. Ireland; and *Holyhead* on a small island off Western Anglesey, is the L. & N.W.R. ferry town for Dublin.

The three largest towns in Wales, with their population at the last census (1911), are given below :—

TOWN.	Population in 1911.
City of Cardiff . . . . .	182,259
Swansea . . . . .	114,663
Merthyr Tydvil . . . . .	80,990

Cardiff has a greater population than any Welsh county, except its own (Glamorgan).

# THE ENGLISH LAKE DISTRICT

THE English Lake District, famous for its beauties of mountain, fell, and dale, is mainly occupied by the highlands of Cumberland and Westmorland.

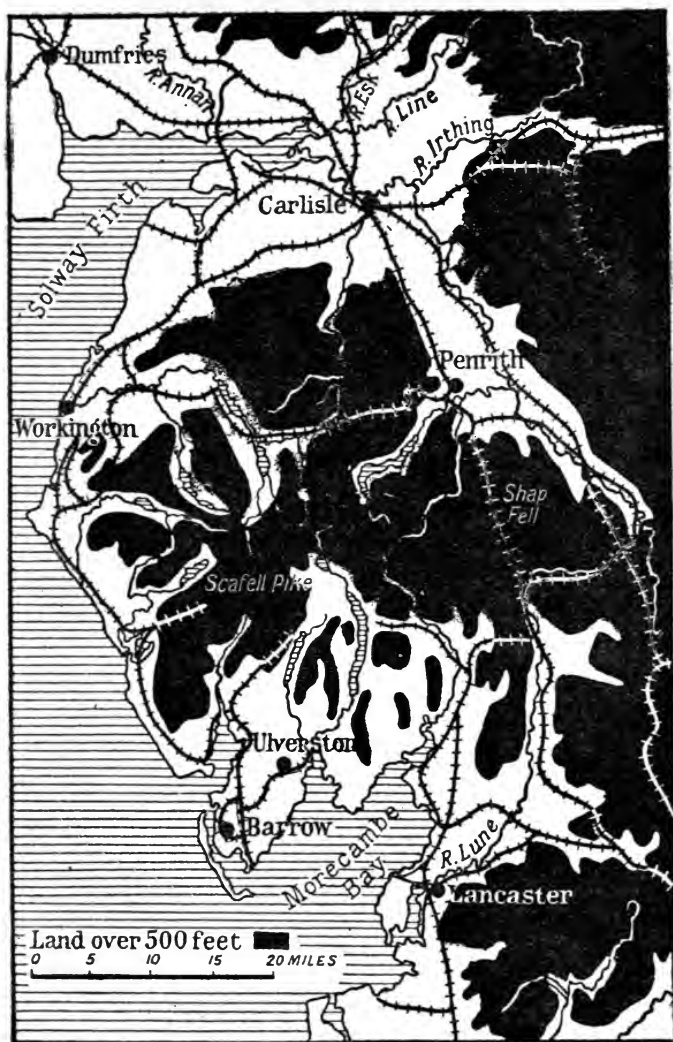
Like the mountains of Wales and northern Scotland, the highland region of the Lake District is an ancient uplift (slightly dome-shaped) which has been carved and sculptured by the moving ice of prehistoric glaciers and by the power of running water. The mountains of Cumberland and Westmorland are 'residual mountains'—a fact which becomes clear to anyone who climbs one of the peaks on a fine day and takes a wide survey of the surrounding scenery.

## GENERAL STRUCTURE

To the student of geography, and to the tourist, the Lake District presents advantages which are lacking in Switzerland or Norway. Here we have packed in small compass a wonderful series of mountains, valleys, and lakes, which can be studied with ease from one of the heights. The tourist who wishes to ascend a peak has no need to undertake long, wearisome, and uninteresting tramps up toilsome approaches before he comes to something worthy of a pause; the mountains spring up steeply from the valley floors, and all are accessible to a reasonably active person. There is a well authenticated record of a famous athlete who climbed all the chief peaks in the Lake District in less than twenty-four hours.

A feature of the region is its wonderful series of 'radiate' valleys, each with its stream and its lake. From the central mass, which includes Scafell Pike (3,210 feet, the highest point in England), Scafell, Great End, and Bow Fell, radiate—





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FIG. 19.—THE LAKE DISTRICT

## *Geography of the Homeland*

(1) The wide valley of Borrowdale, leading down to *Derwentwater* and *Bassenthwaite Water*.

(2) *Buttermere* and *Crummock Water* leading by way of the Cocker Valley to Cockermouth.

(3) Ennerdale, with *Ennerdale Water*.

(4) Wastdale, with *Wastwater*, above which, on its eastern side, tower the famous 'screes.'

(5) Eskdale.

(6) The Duddon Valley leading to the Duddon estuary.

(7) Langdale and the Rothay Valley (with *Grasmere Lake* and *Rydal Water*), leading down to *Windermere*, the largest of the lakes.

(8) Yewdale, leading down to *Coniston Water*, above which stands sentinel Coniston Old Man.

Another great central knot is Helvellyn, on the western side of which lies *Thirlmere* (whence Manchester gets its water-supply), and on the eastern side *Ulleswater*, draining to Penrith and the Eden Valley. Further north is the great slate uplift of Skiddaw (3,054 feet).

The mountains of the Lake District are linked with the Pennines by the high saddle of Shap Fell, over which both the Midland Railway and the London and North-Western Railway pass on their way to the Eden Valley and the great railway centre of Carlisle.

### LAKES, VALLEYS, AND ICEWORK

The lakes are for the most part long and narrow, and owe their origin to the damming up of hollows in the valley floors by old glacial moraines or by

## *The English Lake District*

'screes' (long slopes of finely broken rock material streaming down to the valleys from the steep heights). Long, narrow lakes of this type are known as 'ribbon lakes,' and are common in most mountain systems.

All the lakes are in process of filling by the silt brought down by the rivers which feed them, as may be seen from the many deltaic extensions into the lakes where streams enter. Bassenthwaite and Derwent-water were originally one large lake, which had its middle portion silted up by the inflowing Greta from the east, and Newlands Beck on the west. *Keswick*, the tourist centre for this area, is built upon land thus formed.

In many of the dales may be seen plenty of evidence of former glaciation. Series of old moraines, erratic blocks, *roches moutonnées* and rocks smoothed and deeply grooved by the passage of the ancient ice-sheets are common, in spite of the fact that stream action has considerably deepened and modified most of the valleys.

### COMMUNICATIONS

The southern gateway to the Lake District is by the L.N.W.R. through Lancaster and Kendal, whence a branch goes to Windermere, or the Furness Railway, which skirts the shores of Morecambe Bay, and follows the narrow western coast-plain.

The northern gateway is the great centre of *Carlisle*, on which converge the M.R. and the L.N.W.R. from the south, the N.E.R. from Newcastle by way of the Tyne gap in the Pennines; the Cambrian Railway from the coalfield of Whitehaven, the North British from Edinburgh, the Caledonian from Glasgow and Edinburgh, and the Glasgow and South-Western from Glasgow. These railways and their relation to Carlisle

## *Geography of the Homeland*

can best be appreciated by drawing a simple diagram with Carlisle as its centre.

The only transverse route is the line from Penrith via Keswick and Cockermouth to Whitehaven. Yorkshire's busy industrial area is linked with the main Midland and London and North-Western trunk routes by several transverse lines through the Pennine valleys and dales.

Elsewhere the communication between one valley and another over the low passes is on foot, or by pony, or by the many coaches which ply for hire in the tourist season.

### CLIMATE AND FARMING

The mountains rise abruptly in the path of the prevailing westerlies, and the whole region is subject to frequent and heavy rains, which tend to mar the joys of a holiday. *Seathwaite*, just below the famous Sty Head Pass, has the heaviest recorded rainfall of English towns and villages. Its average over a large number of years is about 132 inches, though a yearly rainfall of more than 150 inches is common.

The heavy rain and the lack of broad areas of arable land are against agriculture, and stock-breeding (especially of sheep) is the main industry. The chief plough land lies in the Eden Valley and along the shore of the Solway Firth. Cattle are bred in the dales, and sheep roam over the fells. The Lake District has its own peculiar breed of sheep—the Herdwicks, which are peculiarly suited to life on the bleak fells and upland pastures.

### MINING AND QUARRYING

The most important mining areas are the Cumberland coalfield and the ironfields of the Furness District.

## *The English Lake District*

The Cumberland coalfield lies along the coast-plain between *Maryport* and *Whitehaven*, which are its chief outlets for coal export. *Workington*, about half-way between these two ports, has iron smelting works.

*Barrow* is the great centre of the Furness iron-working area, and is famous for its steel and iron and its shipbuilding. It has a good harbour behind the shelter of Walvey Island.

Lead, zinc, and copper are mined in various places among the mountains; and graphite deposits, now more or less exhausted, gave rise to the black-lead pencil industry of *Keswick*—which still flourishes, although its supply of raw material has to be imported from abroad (mainly from Ceylon).

Quarries of slates and building stone are common. Most of the houses are built of faced stone, and loose stones and slabs of rock are piled up to form the boundaries of fields, pastures and sheep-folds.

### OTHER TOWNS

The chief centres have already been mentioned. *Kendal*, the junction for *Windermere*, has busy boot factories and other industries. *Millom*, across the *Duddon* estuary from *Barrow*, has blast furnaces and ironworks.

*Grasmere* is famous as the home of Wordsworth and Ruskin, and the centre of the literary associations which have made the Lake District world famous.

*Penrith* is an important junction on the L.N.W.R., where the Furness line branches off to *Workington*, *Whitehaven*, and the coast-towns. *Silloth* is a port on the southern shore of the Solway.

# NORTHUMBERLAND, DURHAM, AND THE CLEVELAND DISTRICT

**N**ORTHUMBERLAND, Durham, and the Cleveland District of North Yorkshire form an industrial region more or less apart by itself. On the east lies the sea ; on the west the Pennine moors. On the north there is but a narrow gateway into Scotland, along the Berwick coast-plain between the Cheviots and the sea. On the south, similarly, there is the comparatively narrow gateway of the Swale Valley, between the North York moors and the Pennines. To the west there is only one great natural route—the Tyne Gap, which leads to Carlisle and Cumberland.

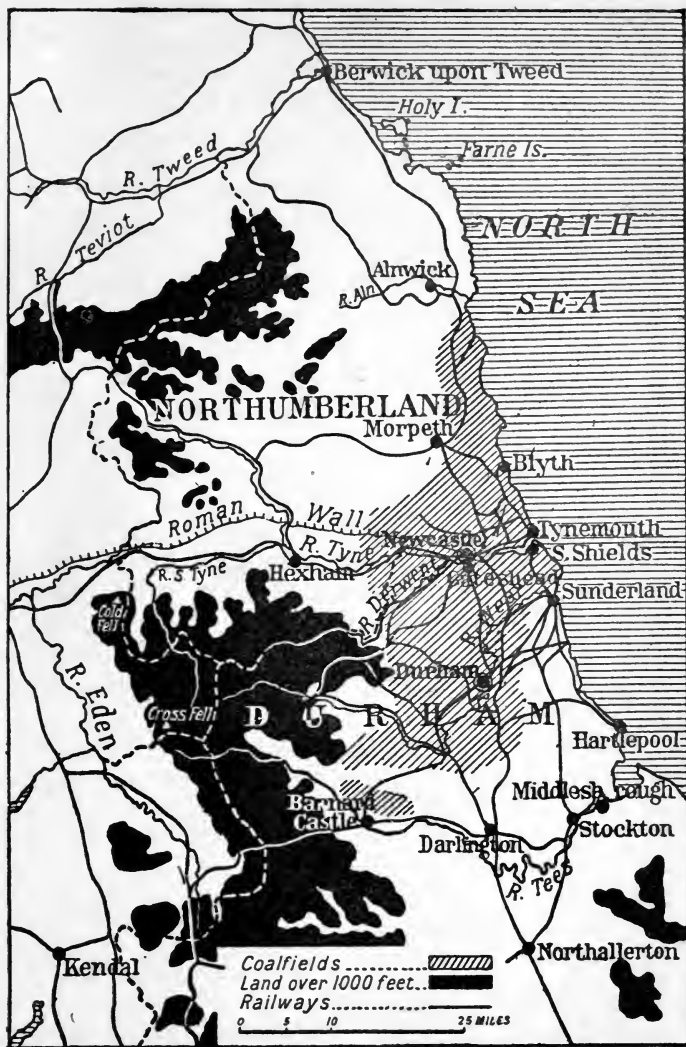
## RELIEF AND DRAINAGE

The general relief is that of a coastal plain rising inland to the moors of the Cheviots and the Pennines, along whose coastline the western boundary of both counties approximately runs.

From the Cheviots the Aln runs down by *Alnwick* to *Alnmouth* on the coast ; and the Coquet flows past *Rothbury* to *Warkworth* at its mouth.

The Tyne draws its waters from the Cheviots and from the Pennines. The Rede and the North Tyne rise in the Cheviots ; up the Rede Valley passes the famous old Roman road of Watling Street on its way across the Cheviots into Scotland ; and up the North Tyne Valley runs a branch line from *Hexham* to join the Waverley route to Edinburgh from Carlisle.

The South Tyne rises in the Pennines of Cumberland, not far from Cross Fell and the headwaters of the Tees, and in the midst of a region rich in zinc and lead ores. It is the South Tyne which has made the famous



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FIG. 20.—NORTH-EASTERN ENGLAND

## *Geography of the Homeland*

'Tyne Gap' in the Northern Pennines; through it runs the North-Eastern Railway from Carlisle via *Haltwhistle*, *Hexham*, and *Newcastle* to the ports of the Tyne mouth.

Farther south is the Durham Wear, which rises near the South Tyne and the Tees, flowing down Weardale to *Bishop Auckland*, *Durham*, and on to *Sunderland* at its mouth.

The Tees rises near Cross Fell, and flows down Teesdale, leaping 'High Force' on its way to the railhead at Middleton, and forming the southern boundary of Durham to its mouth. *Darlington*, *Stockton*, *Middlesbrough*, and the *Hartlepoons* are the great Tees towns.

### COMMUNICATIONS

The main lines of communication naturally follow the coastal plain. The North-Eastern Railway crosses the Tees near Darlington, and runs almost due north by way of Durham, Gateshead, Newcastle, and Morpeth, to Berwick, whence the North British Railway continues the main East Coast route to Edinburgh and Aberdeen.

The whole of this route teems with historical associations. It is the main natural route into Scotland by way of the East Coast, and was hotly contested in border forays and pitched battles during the hundreds of years of Anglo-Scottish warfare. It is thickly sprinkled with castles and fortress towns, and through the Tyne Gap (following its northern slopes) may still be seen the Roman wall which Emperor Hadrian built to keep back the Picts.

Off the north-eastern coast is *Lindisfarne* (Holy Isle), where Aidan, the monk from Columba's monastery of Iona, lived and taught, and whence Christianity



## *Northumberland and Durham*

and learning spread over all Northumbria, until it was renowned throughout Europe for its culture. Bede, the learned monk of Jarrow, lived in the monasteries of Wearmouth and Jarrow.

### CLIMATE AND FARMING

Northumberland and Durham lie on the leeward side of the Pennines, and therefore are not so wet as the Western Pennines and the Lake District. Seathwaite often has 150 inches of rain in a year; but Seaham, on the Durham coast, has less than thirty inches annually. Summers, too, are rather warmer, and winters are colder; the annual range of temperature is greater.

North of the Northumberland and Durham coalfield lies a wide strip of rich arable land, which gives rise to large farms, where barley and potatoes form the chief crops.

Sheep-rearing is extensively carried on in the moorland districts, and Cheviot sheep are famous for their fine wool. The Durham dales breed very fine cattle, and there are many large dairy farms, which help to supply the big towns of the Northumberland, Durham, and Yorkshire industrial areas.

But the most important industry of the whole region is not farming, but mining and iron-smelting.

### THE COALFIELD

The Northumberland-Durham coalfield extends from the mouth of the Coquet, in Northumberland, almost to the Tees. It is the oldest of British coalfields, for it has been worked since 1239. It covers by far the most densely-populated area in the two counties.

The coalfield is chiefly engaged in the production of coal for export, and in iron industries which depend

## *Geography of the Homeland*

largely upon the rich iron mines of the Cleveland district at the back of *Middlesbrough*. The presence of salt-deposits gives rise not only to salt-mining, but also to flourishing chemical industries along the lower Tyne and lower Tees.

'The Coaly Tyne' is the busiest river of north-eastern England. Eight miles up the river stands *Newcastle* (with *Gateshead* on the opposite bank) at the cross-roads between Durham and the north, and between Carlisle and the Tyne mouth. From Newcastle to the sea is 'an almost continuous industrial town,' with great engineering and shipbuilding works, chemical works, glass works, blast furnaces, and steel works. *Elswick* is the home of Armstrong-Whitworth, where ships of the Navy are built and refitted; *Wallsend* (where the Roman wall ends) gives its name to a special kind of coal; *Jarrow* has metallurgical, glass, and chemical works; and *North Shields*, *South Shields*, and *Tynemouth* lie at the mouth of the river and carry on an enormous trade in coal, iron, glass, chemicals, etc., and build large vessels for the mercantile marine.

*Blyth*, a few miles to the north, is also a great centre for the export of coal.

Coal forms over 75 per cent. of the exports from the Tyne. Before the war this was nearly a third of the total British coal export, and the coal was sent not only to European, but to Asiatic, African, and South American ports. The best customers were Italy, France, and Germany.

### THE TEES AND THE IRON OF CLEVELAND

The rich iron deposits of the Cleveland district have given rise not only to the great iron-smelting

## *Northumberland and Durham*

industries of *Middlesbrough*, but they have brought prosperity to *Stockton*, *Darlington*, and the *Hartlepoons*.

The enormous iron industry of the lower Tees was made possible by the famous Thomas process, 'in which ores containing phosphorus can be smelted by the addition of lime to the linings of the Bessemer converters. The magnesium limestone of the Cleveland Hills supplies this necessity.'

Like the Tyne, the Tees has gigantic shipbuilding yards. *Middlesbrough* and the *Hartlepoons*, with *Sunderland* (at the mouth of the Wear), build steel ships and fit them out with every necessity. 'Of late years the north-east coast shipbuilding yards have supplied over half the annual tonnage launched.' Engineering works, munition works, rope and paint works, oil refineries, furniture factories, metallurgical works dependent mainly on the rich lead deposits of Weardale and the zinc of Alston Moor, glass works, chemical works, and salt works are all flourishing in this busy area.

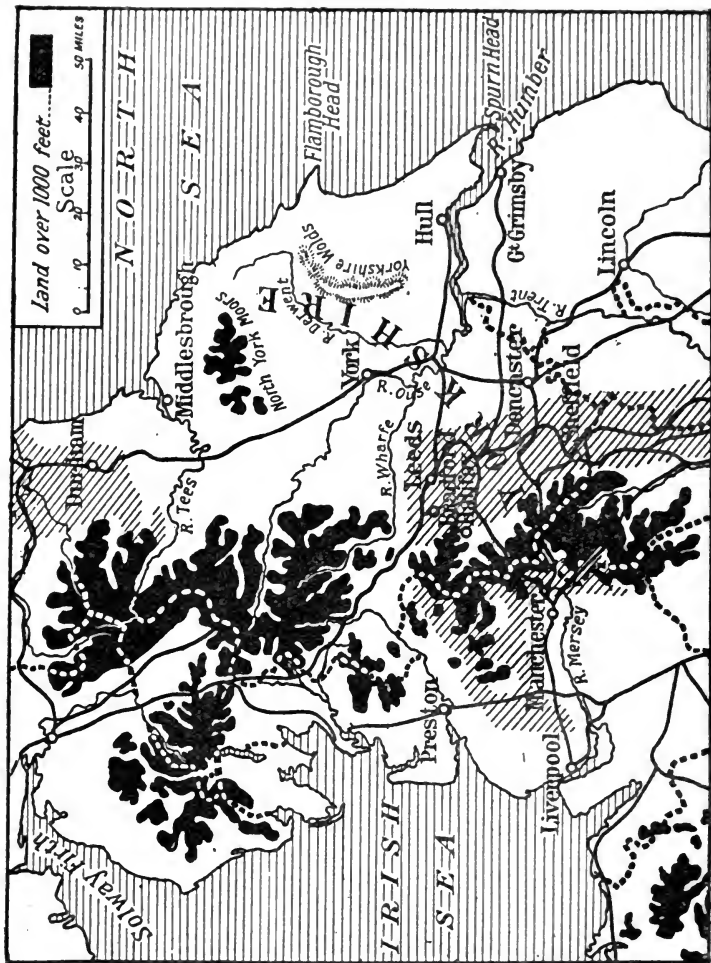
*Darlington* specialises in the manufacture of railway engines and rolling stock (N.E.R.).

### OTHER TOWNS

*Durham*, the county town, has a fine old castle built by William the Conqueror, and a beautiful cathedral overlooking the Wear.

*Barnard Castle*, up the Tees, has a history going back to the days of the Norman Conquest. *Alnwick* is famous for its castle. *Hexham*, at the junction of the Tyne, is a well-known starting point for walks on the Pennine Moors or for visits to the Roman wall.

*Berwick-on-Tweed* is the famous old border town in English territory. There is salmon fishing.



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FIG. 21.—THE NORTHERN COUNTIES

# YORKSHIRE

**Y**ORKSHIRE is the largest English county. For purposes of administration it has been divided into 'ridings'—North, East, and West. Of the three, the West Riding is the largest, the most densely populated, and by far the most important; alone it is bigger than any English county save that of which it forms part.

## PHYSICAL STUDY

On the map, the Pennine Moors in the west, and the North York Moors and the Yorkshire Wolds in the east, give character to the region. Between the Pennines and the York Moors and Wolds lies the rich vale of York, draining by the Ouse and its tributaries to the long estuary of the Humber, which also serves as outlet to the Trent system. Between the York Moors and the York Wolds lies the fertile Vale of Pickering, drained by the Yorkshire Derwent. South and east of the Wolds lies the flat low plain of Holderness.

This helps us to divide Yorkshire into the following natural divisions :—

1. The Pennine Moors and slopes.
2. The Vale of York and the Vale of Cleveland.
3. The North York Moors.
4. The Vale of Pickering.
5. The Yorkshire Wolds.
6. Holderness.

*The Pennines* form the backbone of northern England. The Pennine Axis is not a range of mountains, but a broad long plateau system deeply trenched by its rivers. Thus it is incorrect to call it 'The Pennine Chain.' It was originally a long domed uplift, consisting of three important strata—the mountain limestone, the millstone grit, and the coal measures

## *Geography of the Homeland*

But age-long denudation has worn away the top of the long ridge, so that in the Southern Pennines the mountain limestone is exposed in the middle portion, flanked by exposures of the millstone grit, which, in turn, is flanked by the coal measures. Walking from the West Riding over the Pennine Moors into the cotton district of Lancashire, we should cross (1) coal measures, (2) millstone grit, (3) mountain limestone, (4) millstone grit, and (5) coal measures again. Seaward of the coal measures on both sides of the Southern Pennines lie horizontal beds of new red sandstone.

The highest points in the Pennine Axis lie well toward its western edge. Notice particularly the positions of Cross Fell, Wharfedale, and Ingleborough, all of which are well over 2,000 feet in height.

The *Peak District* of the Southern Pennine is the most remarkable limestone region in England. Like the Mendips, to which we have referred in a previous article, the Peak District is famous for its pinnacled crags, high precipices, caverns, and underground rivers; and large numbers of sheep are reared on its upland pastures.

The *North York Moors* consist of sandstones and shales of oolite ridge, which can be traced in a more or less continuous escarpment as far as the Cotswolds of Gloucestershire. The steep edges of the Cleveland Hills, which forms the north-facing edge of the York Moors, is famous for its rich bands of ironstone which supplies the smelters and iron foundries of Middlesbrough. The seaward side of the York Moors produces the high coastline between Scarborough and Tees-mouth.

The *York Wolds* are rounded uplands, practically treeless, and underlain by chalk, which comes to the sea in Flamborough Head.

## Yorkshire

Between the moors and the wolds lies the clay Vale of Pickering, where once existed a lake, whose waters were held back by the steep edge of a prehistoric glacier.

*Holderness* is covered with boulder clay, gravel, and alluvium. From time to time in English history its eastern coastline has suffered by inroads of the sea—partly the result of a slow sinking of the shorelands. The sandy ‘hook’ of Spurn Head has been partly built up of the silt and gravel deposited there by tidal currents.

### CLIMATE AND FARMING

Study of the mean annual rainfall map shows that the eastern slopes of the Pennines are much drier than the western. Yorkshire is drier than Lancashire, except where the moors and the wolds offer steep sides to the prevailing westerlies. Most of Lancashire has an average rainfall of more than forty inches annually; Yorkshire has less than thirty inches.

Yorkshire, as a whole, has greater extremes of temperature than Lancashire, which gets the full benefit of the prevailing warm westerlies in winter, and which has more frequently cooling breezes from the sea in summer. Yorkshire as a whole has more sunshine than Lancashire.

The various forms of farming in Yorkshire, especially agriculture and stock-rearing, are well illustrated in the following tables, extracted from publications of the Board of Agriculture and Fisheries:—

RIDING.	Total Area in Acres.	Percentage of Total Area.			
		Mountain and Heath.	Woods.	Pasture.	Arable.
East . . . .	748,263	.3	2.5	30.4	59.8
North . . . .	1,357,433	22.4	4.2	39.7	23.8
West . . . .	1,763,304	13.2	3.8	47.0	19.4

## *Geography of the Homeland*

The figures in this and other tables are given for examination and comparison. Make a tracing of Yorkshire, and insert the boundaries of the three 'Ridings.' Lay the tracing on a physical map of the same scale, and the figures under 'Mountain and Heath' immediately become intelligible.

The West Riding has most permanent pasture, and sheep rearing is an important industry. The East Riding has by far the highest percentage of arable land, and contains the greater portion of the rich ploughland of the country.

The following table gives evidence of the proportions in which various crops are grown :—

RIDING.	Percentage of Total Area under—			
	Wheat.	Barley.	Oats.	Root Crops.
East. . . . .	8.0	10.5	12.1	12.6
North . . . . .	1.4	5.5	5.2	4.8
West . . . . .	2.6	2.9	4.3	4.5

This table must be studied in connexion with the first. The East Riding is by far the most important in all agriculture, because, as shown in the first table, it has by far the greatest proportion of arable land. Why are oats and barley more important crops in Yorkshire than wheat ?

The next table gives the number of animals fed on the pastures. This again should be studied in connexion with the first table :—

RIDING.	Animals per 100 Acres.		
	Cattle.	Sheep.	Pigs.
East . . . . .	13	58	7
North . . . . .	13	51	3
West . . . . .	15	56	5



## *Yorkshire*

Everywhere sheep are the most important animals. The East Riding leads in number of sheep, because, in spite of its large area under agriculture, it has also a large percentage of permanent pasture, and the undulating hills of the York Wolds are particularly well suited for sheepfarming.

### INDUSTRIES AND TOWNS

The most important industry of Yorkshire is the woollen industry, which grew up in the West Riding for the following reasons :—

(1) The Pennine Moors fed large numbers of sheep, which supplied the wool.

(2) At first this wool, like most of that produced in England, was exported to Flanders to be there made into cloth.

(3) Exiled Flemish weavers settled in the West Riding, where there was plenty of wool, and abundant water power for their looms, and clear streams for wool-washing.

(4) When steam power took the place of water power, the rich coal deposits of the Yorkshire coalfield in the West Riding made this part of England the chief woollen manufacturing region in the British Isles.

Now, the home supplies of wool are altogether inadequate to keep the great woollen mills running, and enormous quantities of wool have to be imported from Australia, New Zealand, the Argentine, Central Europe, and Natal, through the ports of Hull, Liverpool, and London. Most of the wool is landed at the Port of London, whence it is transported by rail to the big woollen towns of the West Riding.

## *Geography of the Homeland*

*Leeds*, at the entry to Airedale, *Bradford*, *Wakefield*, *Halifax*, and *Huddersfield*, are the main centres of the great woollen industrial area of the West Riding. There are many smaller towns engaged in the same industry. As in all great industrial areas, certain towns have specialised in certain branches of the local industry. *Leeds*, for example, specialises in ready-made clothing, and also has smelting and engineering works. *Bradford* is famous for its mohair weaving; *Huddersfield* for its broadcloth and its dyes; *Halifax* for carpets; and *Dewsbury* for shoddy.

Many centres in the western region of the West Riding produce *cotton* goods, also on a large scale. The climate here is as moist as that of South Lancashire. *Bradford* has large cotton mills.

Another great Yorkshire industry is the *steel* industry, which is centred at *Sheffield*—famous all the world over for cutlery. Sheffield has the advantage of the following local raw materials :—

- (1) *Coal* from the Yorkshire coalfield.
- (2) *Ironstone* for making iron and steel.
- (3) *Gannister*—a kind of sandstone used for moulds in casting metal.
- (4) *Limestone* for use in blast furnaces.
- (5) *Dolomite* for lining Bessemer Converters used in the production of steel.
- (6) *Millstone grit* for making grinding stones for cutlery.

Before the use of steam, water power was necessary for turning the grindstones, and the many streams near by provided it, and thus did much to establish the cutlery industry in this locality. *Rotherham* is also noted for its cutlery and tools.

## Yorkshire

*Doncaster* specialises in railway engines and plant ; *Castleford* in glass ; and *Burnley* manufactures linen as well as woollen goods.

*York*, the county town, and once the Roman capital of Britain, is the great market town of the fertile Vale of York.

*Hull* is the great gateway to Yorkshire, though *Liverpool* in some ways is more important in this connexion. Hull imports wool, timber and dairy produce from Baltic ports, grain, and sugar. Its exports are chiefly cottons and woollens, coal, iron and steel, and fish. It sends out large fishing fleets to the Dogger Bank.

The map on page 154 shows the main lines of communication, and their relation to geographical features. Note particularly the main routes across the Southern Pennines.



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FIG. 22.—MAIN ROUTES ACROSS THE ANGLO-SCOTTISH BORDERLANDS

# THE ANGLO-SCOTTISH BORDERLANDS

THE boundary between England and Scotland consists for the most part of the barrier of the Cheviots. The Cheviots are not high, and are by no means impassable ; but they are sufficiently a barrier to confine the main lines of communication to the narrow coast-plain at either end of their uplift.

## THE SOUTHERN UPLANDS

Beyond the Cheviots lie the Southern Uplands of Scotland, which, like the mountains of the Lake District, have been formed by the gradual dissection by streams of an ancient plateau. Viewed from one of the summits, the whole region is clearly a worn-down plateau, with stream-cut valleys and a number of heights rising approximately to the same level.

The rocks of the Southern Uplands are very old and very hard, very slaty or very gritty. They are very different in their structure from the neighbouring Cheviots, which are chiefly of volcanic origin.

The general slope of this dissected plateau is mainly towards the Solway and the Irish Sea, as may be seen from the many streams which flow in that direction. But in the East there is the wide basin of the Tweed emptying to the North Sea. Draining northwards in a deep valley towards the Central Scottish Lowlands is the Clyde. All these river systems play an important part in (a) the communications across the Anglo-Scottish Border, and (b) the distribution of arable land and agricultural industries.

Find on the map the chief heights—e.g. Mount Merrick, Hart Fell, Broad Law ; and the chief streams which have their origin in this ancient upland mass.

## *Geography of the Homeland*

Near the Upper Clyde, high on the watershed which separates it from the streams flowing southward, are valuable deposits of lead. The town of *Leadhills*, said to be 'the highest town in the British Isles,' gets its name from the lead mines close by.

### THE BORDER AND HISTORY

The Cheviots, and the rugged country of the Southern Uplands beyond, long kept Scotland and England apart. These borderlands have been the scene of constant warfare for hundreds of years; border raids and border forays have coloured its legends and provided material for its ballads from time immemorial.

The great highways along the coast are thickly sprinkled with names that are familiar in our history books. Their approaches are controlled by sites of famous castles, and all along them are the names of famous battlefields in the struggle between the Scots and the English.

The road along the East Coast is the more famous. Here the greatest number of conflicts have taken place, because it was the easiest road, with only the passage of the Tweed and the narrowness of the coastal plain to make the route difficult or dangerous.

The western road was barred by Solway Moss (now solid ground), and farther south by Shap Fell and the western extensions of the Pennines towards the Irish Sea, in the Bowland Forest. Yet on four occasions at least this was the route chosen for invasion from Scotland on behalf of the exiled Stuarts—chiefly because the leaders reckoned on the Stuart sympathies of the people of Lancashire and Cheshire. All of them failed, and only once were the Scots able to effect a successful and orderly retreat into their own land.

## *The Anglo-Scottish Borderlands*

Notice on the eastern road the 'castle-towns' of Newcastle, Alnwick, Bamborough, Norham, and Berwick; and the battlefields of Halidon Hill, Neville's Cross, Flodden, and Dunbar.

### RAILWAY ROUTES

The railways pass along the coast plains, except in the case of the branch line from Hexham in the Tyne Gap, up the valley of the North Tyne by Peel Fell in the Cheviots to Riccarton Junction on the 'Waverley Route' from Carlisle to Edinburgh.

The 'keys' of these main routes are *Berwick* on the East and *Carlisle* on the West.

By far the easiest route into Scotland is the East Coast route provided by the Great Northern and North-Eastern Railways to Berwick, and the North British Railway from Berwick into Scotland.

On the West there are two main routes from London to Carlisle—the Midland and the London and North-Western. From Carlisle *three* main routes into Scotland are available :—

(1) The 'Waverley Route' to Edinburgh by the *North British*, via Liddisdale, the Riccarton Tunnel, Hawick, and the 'Scott Country,' and the Gala Gap between the Lammermuirs and the Moorfoots into Edinburgh.

(2) The *Caledonian Railway*, up Annandale to the Beattock Pass, and down Clydesdale to Carstairs Junction for Edinburgh or Glasgow.

(3) The *Glasgow and South-Western Railway* to Dumfries, up Nithsdale and down the Ayr Valley to Kilmarnock and Glasgow.

Another important route is that from Carlisle along the coastal plain via Dumfries to *Stranraer*, the ferry

## *Geography of the Homeland*

town for *Larne*, in Ireland (a passage of thirty-five miles across the deep and rough North Channel). Another line runs from *Stranraer* up the West coast via *Girvan* and *Ayr* to *Glasgow*, bringing the latter in direct communication with the *Stranraer-Larne* ferry.

### INDUSTRIES AND TOWNS

The rich grass on the lower slopes of the hills has made the region of the Southern Uplands an important sheep-rearing region. The rearing of sheep and the presence of clear running water gave rise to the important woollen industry of the *Tweed Valley* at *Hawick*, *Selkirk*, *Peebles*, and *Galashiels*, where the famous Scottish 'tweeds' are woven. The three chief sheep-rearing counties are *Roxburgh*, *Selkirk*, and *Berwick*.

Cattle are reared chiefly in the valleys and on the coastal plains. *Ayrshire* cattle—a famous dairy breed—flourish on the *Ayr* lowlands; *Galloway* cattle, for fattening, are reared in the counties of *Wigtown* and *Kircudbright*. Dairy farming is a common industry in these regions.

Agriculture is necessarily confined to the fertile coast plains and river valleys. Oats, potatoes, and turnips are the chief crops; around *Dunbar* lies a rich red soil, where the potatoes known as 'Dunbar Reds' are grown. Near *Girvan* is another famous potato-growing region, noted for its early potatoes. Seed potatoes from Scotland are much sought after for planting in England, because they are known to produce the heaviest and soundest crops.

Most of the towns (except those engaged in the 'tweed' industry) are market towns, situated at points in the valleys where farmers have found it



## *The Anglo-Scottish Borderlands*

convenient to meet for the exchange of goods. The chief of these market towns are *Dumfries* and *Moffat*.

In the secluded valleys the monks of old tilled the fertile soil, tended their cattle, and built their beautiful monasteries and abbeys. Such towns as *Kelso*, *Jedburgh*, and *Melrose* keep their memory alive to-day; for these are towns that originally grew up around abbeys or monasteries.

# SCOTLAND

SCOTLAND falls into three great natural divisions :—

(1) The Southern Uplands, dealt with in our last article ;

(2) The Scottish Rift Valley, or the Lowlands ;

(3) The Scottish Highlands and Islands, cleft in twain by the long narrow rift of Glenmore, through which runs the Caledonian Canal.

Of the three divisions, the Scottish Rift Valley is by far the most important. It is not going too far to say that from an economic point of view the Scottish Rift Valley is Scotland.

## THE POPULATION MAP

We can gather something as to its importance from the Population Map. Roughly speaking, Scotland has about the same population as Ireland—about 350,000 more in actual fact. But whereas the population of Ireland is more or less evenly distributed, that of Scotland is mainly concentrated in the Lowland Rift Valley. In the Lowlands lie all the biggest towns, and all the busiest industrial areas. North of the Lowlands is a great expanse of mountain region whose very nature forbids the development of a dense population, for much of it is barren rock or open moor, on which agriculture is impossible, where coal and iron do not exist, and where the ruggedness of the country makes communications difficult.

If we examine the actual population figures which resulted from the last census (1911) and consider them in connexion with areas, we find :—

(1) That the average density of population per 100 acres is twenty-five.

## *Scotland*

(2) That in the following counties (all in the Rift Valley) the respective densities are :—

County.	People per 100 Acres.
Lanark . . . .	257
Edinburgh . . . .	216
Renfrew . . . .	205
Linlithgow . . . .	104

In Lanark the density of population is over ten times the average for all Scotland ; and in Edinburgh and Renfrew over eight times as much.

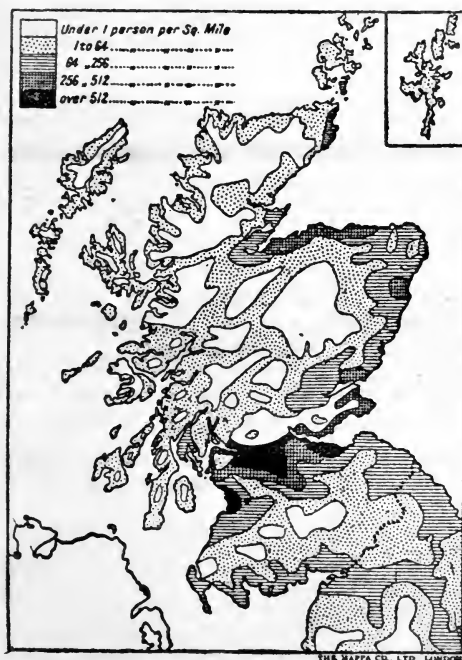


FIG. 23.—POPULATION MAP OF SCOTLAND

## *Geography of the Homeland*

Contrast the figures given in the above table with those in the following :—

County.	People per 100 Acres.
Sutherland . . .	1½
Inverness . . .	3
Argyll . . . . .	3½

### IMPORTANCE OF THE RIFT VALLEY

The Scottish Rift Valley contains a very large proportion of Scotland's total population.

Why is this ?

It is because in the Rift Valley are rich deposits of coal and iron ; and coal and iron form the basis of

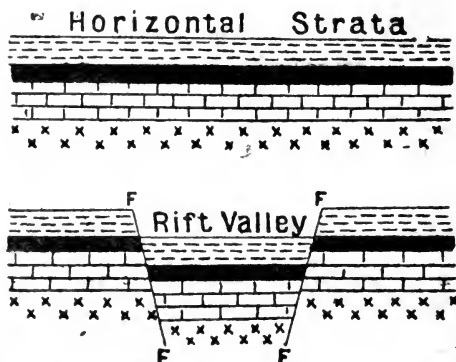


FIG. 24.—DIAGRAM ILLUSTRATING THE FORMATION OF  
A RIFT VALLEY

modern manufactures. Because of the great coal fields and mineral deposits, industries of many kinds have sprung up in this region, offering well-paid work to hundreds of thousands of people. And we have not only to think of the thousands who work in the mines or in the factories, but of the thousands who help to

## *Scotland*

transport the goods, to feed the workers, and to minister to their other needs, as well as of the great army of clerks and warehousemen and salesmen who record and make the sales of the various businesses.

Another reason why this area is the most important part of all Scotland is that there is to be found the richest and most continuous stretch of fertile soil on which crops can be grown.

If we add to the rich coal and iron deposits and the fertile soil the presence of fine harbours, penetrating deeply into the heart of the busy industrial areas, and looking one way towards the markets of America, and the other towards the markets of North Continental Europe, we have all the chief reasons which explain why the Scottish Rift Valley is the most densely populated region in all Scotland, as well as one of the most important industrial areas in the Homeland.

### RIFT VALLEYS

‘Rift Valley’ is an expression which we shall often find it necessary to use in our geography. It is important that we should understand exactly what it means.

Rocks originally laid down horizontally in the waters of pre-historic seas, lakes, and oceans, have become dry land. But in most cases the rock layers are no longer horizontal, but are bent, folded, and even twisted in extraordinary fashion by great earth forces and earth changes.

Sometimes, instead of folding or bending, great layers of rocks have cracked to a considerable depth. Such cracks are known as ‘faults.’ Sometimes two series of faults occur parallel to each other and the piece of earthcrust between them slips down (as shown in Fig. 24), forming a valley with steep sides. The steep

## *Geography of the Homeland*

sides and sharp edges are soon worn and smoothed by weathering and so covered by natural vegetation that only the geologist can say that the valley has been formed in the way it has. Valleys formed by the letting down of a portion of earth-crust between lines of parallel faults are called 'rift valleys.'



FIG. 25.—PHYSICAL DIVISIONS OF SCOTLAND

This has happened in Scotland. If we could examine a big geological map we should find that along a line joining Stonehaven with, say, Dumbarton, there occur hundreds of fault-lines, all running more or less in the same general direction. Between Dumbarton and

## *Scotland*

Ballantrae runs a similar series of faults. Now between the two great faults the land has been let down in past ages—long before the coming of the first men on the earth—to form what we call to-day the Scottish Rift Valley.

In the hollow thus formed other sediments collected, covering up the precious coal and iron which were removed from the rest of Scotland by the wearing away of the land. To this alone Scotland owes the preservation of the valuable minerals which is the secret of much of her present prosperity. Scottish industries are based upon the results of a 'geological accident'—upon the great faults which let down the Rift Valley and preserved the coal and iron.

Other famous rift valleys in Europe are the Rhine Rift Valley between the Vosges and the Black Forest, and the Rhone Rift Valley between the Pyrenees and the Alps. The Jordan Valley and the Dead Sea and the long trough of the Red Sea are yet other examples.

### THE SCOTTISH RIFT VALLEY

The valley itself is some fifty miles in width. A few miles south of the northern border fault-line runs a chain of volcanic hills, which are clearly marked on the Atlas map as the Kilpatrick Hills, the Campsie Fells, the Ochill Hills, and the Sidlaw Hills. Between this line of volcanic hills and the edge of the Highlands runs a long narrow fertile plain called 'Strathmore'—the Great Valley. Notice also between the Sidlaws and the Firth of Tay the famous Carse of Gowrie, noted for its fruit-growing and its wheat.

Parallel with the southern border fault-line another line of volcanic hills can be traced. They are most clearly marked in the Pentlands.

## *Geography of the Homeland*

Between the two lines of volcanic hills lies the fertile basin of the lower Clyde and lower Forth, with their great coalfields and busy industrial centres. Across it runs the Clyde-Forth Canal, linking the two great estuaries. This canal admits only canal-boats, but for many years there has been discussed a project for widening and deepening it, and thus converting it into a great ship-canal comparable in size and importance with the Manchester Ship Canal. The advantages of such a water-way would be tremendous, both to Edinburgh and Glasgow.



# THE SCOTTISH RIFT VALLEY

**A**S we have seen from the Population Map, the Scottish Rift Valley is by far the most important industrial region in Scotland ; indeed, only one important industrial area, the Valley of the Tweed, lies outside it.

## AGRICULTURAL INDUSTRIES

The rich soil of the Lowlands makes this region the most important agricultural area of Scotland. In Fifeshire and Haddingtonshire is grown at least a third of Scotland's wheat. Both these counties lie on the eastern, drier, sunnier side of Scotland.

The ' great valley ' of Strathmore is highly cultivated, and mixed farming is the rule. Heavy crops of barley are grown ; much of it is used in neighbouring distilleries. Potatoes are very important and supply seed for the potato fields of Lancashire and Lincolnshire.

' The Lothians ' grow barley, potatoes, oats, and hay. Mention has already been made of the fruit-cultivation in the Carse of Gowrie, between the Ochills and the Firth of Tay.

On the hill pastures sheep and cattle are reared. The eastern half produces most sheep.

## THE COAL FIELDS

Within the Rift Valley lie Scotland's stores of coal and iron. The chief coalfields are :—

1. The Ayrshire Coalfield on the west.
2. The Lanarkshire Coalfield—by far the most important—in the middle Clyde Basin.

# Geography of the Homeland

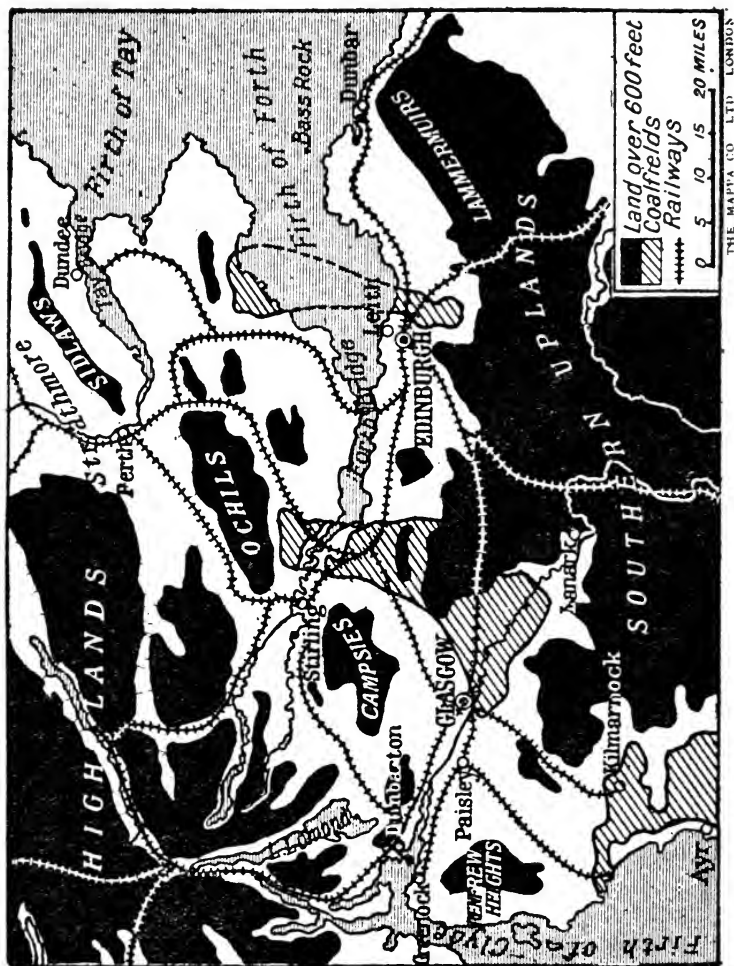


FIG. 26.—MAP OF THE RIFT VALLEY OF SCOTLAND, SHOWING THE COALFIELD

## *The Scottish Rift Valley*

3. The Firth of Forth Coalfields, which include :

- (a) The Midlothian Coalfield, just east of Edinburgh,
- (b) Dunfermline Coalfield, on the opposite side of the Firth of Forth.

Upon these coalfields and the neighbouring iron, depend the flourishing industries of the Rift Valley. Not only coal and iron, but limestone is present in abundance, so that all the materials for the production of iron and steel are together in the same spot. The Clyde estuary is a splendid harbour, and there is another on the opposite side of the Rift Valley, in the Firth of Forth. All these things favour the development of a great industry.

The Ayrshire Coalfield exports a great deal of coal through its ports of Ayr, Ardrossan, and Troon, especially to the busy manufacturing city of Belfast in Northern Ireland. Kilmarnock has engineering works, and specialises in locomotives and pumping machinery for the mines. Irvine, on the coast, smelts copper.

The Lanarkshire Coalfield supports a number of large towns engaged in the iron and steel industry. Coatbridge, Airdrie, Motherwell, Wishaw, and Falkirk have blast furnaces, and engineering shops. Hamilton is a mining town.

But the great centre of the whole region is Glasgow, the largest town in Scotland, and the home of many flourishing industries. All along the Clyde, from Glasgow to the sea, are great engineering works and ship-building yards. Port Glasgow, Dumbarton, Greenock, and Gourock, are all engaged in these industries. Marine engineering—the manufacture of engines for steamships—is the specialised form of the industry of

## *Geography of the Homeland*

the Clyde. Some of the world's largest liners have been built in Clyde shipyards, and the Clyde is easily the most important shipbuilding centre in the world.

When trade began with the Americas the importance of the site of Glasgow soon gave her a prominent share in commerce with the New World. The Clyde, then a small stream, was deepened to admit the largest vessels, and Glasgow soon grew into a great and flourishing port. Sugar from America led to the establishment of sugar refineries; cotton from America, and the moist climate (like that of South Lancashire) led to the growth of a great cotton-spinning industry; tobacco from America gave rise to important tobacco manufactures.

Paisley spins cotton-thread, makes flour, and starch, and manufactures electrical and cotton-spinning machinery. Greenock has great sugar refineries.

The Firth of Forth Coalfields are smaller, but support some flourishing industries. In the Lothians are sandstones which yield oil-shale, from which oil can be obtained. 'Each ton of shale yields 20 gallons of oil, and 45 pounds of ammonium sulphate, which is used as a fertiliser.' In connexion with this the linoleum and oilcloth industry of Kirkealdy should be noted. The jute for the oilcloth comes from India; and the cork for the linoleum from Spain—both by ship to the Firth of Forth.

Dunfermline is famous for its linen and jute factories; so is Dundee, farther north, on the Firth of Tay.

The chief ports on the Forth Estuary are Granton; Grangemouth, Bo'ness, and Alloa, engaged in coal export trade; Leith, the port of Edinburgh, and Rosyth, the great naval depot near the northern end of the famous Forth Bridge, which carries the North British Railway across the Firth.

## *The Scottish Rift Valley*

### THE CAPITAL AND OTHER TOWNS

Edinburgh, the Scottish capital, is a 'castle-town'; it grew up around the fortress built by King Edwin of Northumbria, to command the coastal route. Here are the chief business offices of big firms, the law courts, administrative offices, and a wide variety of industries to satisfy local needs. Important industries are paper-making and printing, flour-milling, and rubber manufacture.

Stirling is a 'bridge-town,' and has a famous castle perched on a high volcanic rock, and dominating the main gateway to the Highlands.

Perth stands below the meeting-place of several tributary valleys of the Tay; it has dyeworks, and linen, and jute manufactures. Not far away is Scone, the ancient royal town of Scotland. Dundee, on the Firth of Tay, weaves linen and jute, and makes jam from the fruit of the Carse of Gowrie. Its whaling industry has almost disappeared. Its chief trade is normally with the Baltic Lands on the opposite side of the North Sea.

St. Andrews, in Fife, has a famous old university. Arbroath and Montrose have small linen and jute industries.

# THE HIGHLANDS AND ISLANDS OF SCOTLAND

**S**COTLAND north of the Rift Valley consists of the Highlands, with their wonderful fringes of western islands.

The Highlands are divided by the deep cleft of Glenmore—the 'Great Glen'—through which runs the Caledonian Canal, into the Grampians, or Central Highlands, and the Northern Highlands. Thus the main physical divisions are :—(1) Grampians or Central Highlands; (2) Northern Highlands; and (3) the Hebrides.

## SURFACE RELIEF

The whole Highland region is what remains of an ancient plateau of very old rock, after dissection by many streams. From one of the heights one can see many others, all about the same height, but separated from one another by deep valleys cut by prehistoric glaciers and by modern rivers and torrents. The mountains of the Highlands are thus similar in origin to those of Wales and the Lake District.

The Highlands are so rugged that communication is difficult between valley and valley, and in the old days the clan living in a valley kept very much to itself, and lived its own life in its own way, without having much to do with clans even in neighbouring valleys. The Highlanders loved their glens, and were proud of the clan to which they belonged—and they do so to-day. Like all mountain peoples, they have a great love of freedom and independence, and even now are inclined to be reserved in the presence of people who are not of their race. No man has a greater love of his native land than the Scot, yet curiously enough none have been greater wanderers in other lands, and few peoples have made a greater success

## *The Highlands and Islands*



FIG. 27.—THE HIGHLANDS

## *Geography of the Homeland*

of life in 'foreign lands' than these home-loving, independent people of Scotland. This is due chiefly to their aptitude for business, their personal courage, and their inexhaustible enterprise. All these attributes are largely the effects of their native surroundings.

The wonderful scenery of the Scottish Highlands is world-famous. Hundreds of famous writers have paid tribute to it in glowing description, and thousands of tourists pay tribute to it by spending their holiday amidst it every year. Most famous of all is the beauty of the Trossachs—the region around Loch Katrine, whose waters go to swell the Teith tributary of the Forth, and supply the City of Glasgow with clear, fresh drinking-water.

The general tilt of the whole region is eastwards, as may be seen by the direction taken by the streams. The largest river is the Tay, which gathers up the outflow of Loch Tay, Loch Rannoch, Loch Ericht, and other lakes, and pours its waters into the deep Firth of Tay. From the heart of the Grampians flow the Don and the Dee (the latter past Balmoral, the beloved Scottish residence of Queen Victoria), to Aberdeen and the North Sea. The Spey and Findhorn drain through deep glens north-eastwards. Into Dornoch Firth flows the River Shin from Loch Shin in Sutherland. Loch Arne in Argyll and Loch Maree in Ross have outlets westward to the Atlantic. Nearly all the Scottish lakes are 'ribbon-lakes' formed in deep parts of long valleys, and often dammed back by rubbish from the mountain slopes or by morainic material left by prehistoric glaciers.

### THE WEST COAST AND THE HEBRIDES

The extraordinary indented west coast of Scotland has an origin similar to that of the Norwegian Fjords,



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or the coast of British Columbia or of Southern Chile. Great glaciers and powerful torrents carved out deep valleys, which were afterwards invaded by the sea when the land gradually sank.

The nearer island fringe of the Inner Hebrides was formed by the peaks and plateaux cut off by the sea invasion of intervening valleys. The Outer Hebrides are separated from the Inner Hebrides by the deep channels of the North Minch, the Little Minch, and the Gulf of the Hebrides—a channel which is considered to be a sea-filled rift valley formed by faulting similar to that which produced the Rift Valley of the Scottish Lowlands.

The Outer Hebrides are much indented. Very often only narrow passages separate the island, and in many places there is only a narrow strip of land between the head of one inlet and that of another on the opposite side. Such narrow isthmuses are called locally 'Tarberts,' or boat-portages, across which boats can easily be dragged to the other coast of the island. The rocks of the Outer Hebrides are very ancient, for overlying rocks have long since been worn away, exposing the oldest of all beneath them.

The islands of Skye and Mull are very different in structure from the rest of the Hebrides. They consist chiefly of the solidified lava which poured forth from the crater of some giant prehistoric volcano, whose foundations perhaps now lie at the bottom of the deep waters of the Minch. Off Mull is the famous island of Staffa, which is largely built up of wonderful columns of basalt, exactly like those which form the Giant's Causeway in Northern Ireland. These columns were formed as the molten lava cooled into basalt. Myriads of cracks opened in its mass, just as cracks open in mud exposed long to the heat of the sun, forming a

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sort of pattern on its surface, but extending very far down into its substance and breaking it up into a distinct columnar structure. At one point on the coast of Staffa is the celebrated Fingal's Cave, whose entrance and whose cavernous hollow is pierced with thousands of these basaltic columns.

### CLIMATE AND VEGETATION

Rainfall over most of the Highlands and Islands is very heavy, especially on the western side, where a yearly rainfall of over eighty inches is the rule. Along the shores of the Moray Firth, however, the rainfall is below thirty inches; for this side is the leeward side, or 'rain-shadow' area. Condensation is heaviest where the moisture-laden winds from the Atlantic are first thrust up by the western mountains.

The heavy rains fill glen and valley with rushing torrent and brimming river. Here is a source of free power awaiting exploitation. There is no need of coal where water-power of such magnitude can be had for the asking. Yet so far comparatively little use has been made of it, except in the cases of the Falls of Foyers (near Fort Augustus and Loch Ness) and Kinlochleven, near Ballachulish (Loch Linnhe), where an artificial fall has been made. In both cases the falls supply power for the extraction of aluminium from its ores. Aluminium is valuable for its lightness, its strength, and its freedom from rust.

In north-eastern Scotland there are still fine pine forests, especially near Aviemore; but large areas are covered by bleak, open moorland, the home of deer and grouse. Cultivation is impossible, and tourists and sportsmen look upon the moors as a sort of 'happy hunting ground.' Sportsmen pay well for the privilege of shooting over a 'deer forest' or

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a 'grouse moor,' and for permission to fish for salmon in the swift rivers.

In Perth and Inverness large numbers of sheep are reared on the moors. Cattle and horses are reared in the valleys and along the coastal plains.

Cultivation is, of course, restricted to the valley bottoms and coastal strips. Even in the extreme north-east and along the shores of the Moray Firth the comparatively sunny, dry summers enable good crops of oats, barley, and potatoes to be raised. The valleys of Aberdeenshire are highly cultivated, and the cattle bred there provide some of the finest beef ever sent to market.

Fishing is an important industry, especially on the east coast, where Findon, Aberdeen, Peterhead, Fraserburgh, Cromarty, Dingwall, and Wick 'cure' great quantities of herring and haddock. On the western coasts fishing provides the scattered villages with an important part of their food, which they eke out with vegetables from their crofts and dairy produce from a few cows.

### COMMUNICATIONS AND TOWNS

The most interesting line of communication is the Highland Railway from Perth, via Inverness and Dingwall, to the far north at Thurso, with a branch across Ross and Cromarty to Strone Ferry and the Kyle of Lochalsh, whence boats run periodically to Stornoway in Lewis and to Portree in Skye. The map (April 7th issue) indicates the general system of rail communication which serves the Highlands and Islands of Scotland.

Another gateway to the Western Highlands is provided by the lines from Stirling and Dumbarton to Oban and to Fort William (under the shoulder of Ben

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Nevis) and Mallaig, whence boats also run to Stornoway.

A coastal route is followed by the railway linking Dundee, Arbroath, Stonehaven, Aberdeen, Peterhead, and Fraserburgh; and also Aberdeen, Elgin, and Inverness.

The Caledonian Canal is not of any great use commercially, for it does not lie between areas of any industrial importance. It has several locks, and does not admit large vessels.

Aberdeen is a large city with a University. It is a great focus of road and railway routes, and, like Peterhead, it has a flourishing industry based upon the fine granites of the Grampians. It builds fishing craft and motor-boats.

Stornoway, the only real 'town' in Lewis, is the centre for disposing of the wool, and of the 'Harris tweeds' woven by the crofters in their own homes.

# GREAT BRITISH RAILWAYS

**C**OMMERCE and industry cannot be carried on successfully without an efficient system of transport. Raw materials and food products must be transported swiftly and regularly from the ports to the big industrial centres; and the manufactured goods must be easily and quickly carried to the ports for export to foreign markets. So far, Britain has had to depend upon her railways for most of this indispensable transport, though the increase of motor traffic is bringing back to the great main roads something of the importance they held in the days before railways.

## ENGLISH RAILWAYS

A complete map of our railways is a very bewildering thing.

First let us notice how all the most important English railways converge upon London or radiate from it like the spokes from the hub of a wheel. This is because London is the first port of the Homeland, the greatest distributing centre for goods brought overseas for the use of the British nation. It is because London is the great controlling 'brain' of commerce, with busy offices representative of all the greatest business firms in the country.

Now look at the five great inlets, each with its port or groups of ports. They are :—

- (1) *London River*, with its busy docks and outposts of Tilbury and Gravesend.
- (2) *The Mersey*, with Liverpool and Birkenhead and the inland waterway of the Manchester Ship Canal.
- (3) *The Humber*, with Hull, Grimsby, and Immingham Dock.

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- (4) *The Bristol Channel*, with Bristol and its outpost of Avonmouth on one side and the great Welsh ports of Cardiff and Swansea on the other.
- (5) *Southampton Water*, with Southampton at its head.

The most important lines of railway traffic are those which link London with the other great groups of ports. Our whole railway system bases its main lines of communication upon the position of our great ports.

### THE GREAT STREAMS OF TRAFFIC

The greatest stream of railway traffic is from London to the north-west across the busy industrial regions of the English Midlands. Joining this great main stream are other smaller ones from Southampton and the Bristol Channel.

This is the natural result of geographical conditions, for Liverpool and the Mersey form the natural gateway not only to busy South Lancashire and West Yorkshire, but also to the industrial Midlands. In the opposite direction the main road leads to London. Another great stream of traffic lies between Hull and Liverpool, both of which take a share of the cotton and chemical industries of Lancashire and the woollen and steel industries of the West Riding; but Liverpool takes a much bigger share than Hull.

On both sides of the Pennines run the great main roads to Scotland—one, the easiest, along the eastern coastal plain, and two others along the western plains and over Shap Fell, which connects the Pennines with the mountain knot of the Lake District. Three or four lines cross the Pennines, linking up the east coast route with the west coast routes. A good example

# Great British Railways



FIG. 28.—RAILWAY COMMUNICATIONS

## *Geography of the Homeland*

is the North-Eastern Railway through the Tyne Gap linking Newcastle with Carlisle.

The East Coast Joint System consists of the Great Northern and North-Eastern Railways to Berwick-on-Tweed, and the North British, which continues the route into Scotland. The West Coast Routes are (1) The Midland Route via Leeds and the Aire Gap, over Shap Fell and down the Eden Valley to Carlisle ; and (2) The London and North-Western Route via Crewe, Lancaster, and Shap Fell to Carlisle. From Carlisle three great Scottish lines continue the routes—the North British ‘Waverley’ Route to Edinburgh through the ‘Scott Country,’ the Caledonian via Carstairs to Edinburgh or Glasgow and the Glasgow and South-Western to Glasgow.

### THE GREAT LINES

Judged from mileage alone, the *Great Western* is the biggest British Railway. Its two great main lines run from Paddington to Reading, where they branch, one going west through Swindon, the Severn Tunnel, Cardiff, Swansea, and Carmarthen to Fishguard, the ferry-town for South Ireland ; the other going south-west through Taunton, Exeter and Plymouth to Penzance. Bath and Bristol are served by big branches from Swindon. Another great route is from Paddington to Birmingham, whence branches run to Birkenhead and North Wales.

Second in order of mileage comes the *London and North-Western*, which runs from Euston through the industrial Midlands to Crewe, where the main lines to Liverpool and Scotland go northwards, and the route to Holyhead (for Ireland) runs westward. From Crewe also a branch runs south-west through Shrews-



## *Great British Railways*

bury to Carmarthen, and another north-east to Stockport and Manchester.

The *Midland* also traverses the busy Midland plain. The main line via Derby and Leeds to Carlisle has already been mentioned. From Derby important branches run to Bristol and to Stockport and Manchester and Lincoln.

The *Great Central* also serves the industrial Midlands and the cotton towns. Its main line runs from Marylebone via Rugby, Leicester and Nottingham to Sheffield, where one branch goes east to Grimsby and Immingham Dock on the Humber, and another west to Manchester.

Linking the industrial regions of Yorkshire with those of South Lancashire are the lines of the *Lancashire and Yorkshire Railway* from Humber to Mersey.

The *Great Eastern* serves the agricultural districts and watering-places of East Anglia, one main line running to Ipswich, where it branches for Norwich and Cromer, and for Lowestoft and Yarmouth respectively; the other running through Cambridge and Ely to King's Lynn, with a branch to Norwich from Ely.

Feeding the ports and holiday resorts of the South Coast are the *Great Western* (already noted), the *London and South-Western* (for Portsmouth, Southampton, Exeter and Plymouth), the *London, Brighton and South Coast* to Brighton (Newhaven for Dieppe), Hastings and Portsmouth, and the *South-Eastern and Chatham* for Dover (Calais and Ostend), Folkestone (Boulogne), and Margate and Ramsgate.

Weymouth, the port for the Channel Islands and St. Malo, is served by the *Great Western*.

## IRELAND—I

**I**RELAND is larger than Scotland, but only by about 2,800 square miles. Between Ireland and the island of Great Britain lies a deep channel, known as the North Channel in the north, St. George's Channel in the south, and broadening out into the Irish Sea in the middle. But although this channel is considerably deeper in many parts than the shallow North Sea, there is plenty of proof that Ireland was once joined to Great Britain. The best evidence appears clearly in the geological map, where the following facts are apparent at a glance :—

1. The mountains of south-east Ireland resemble in structure those of Wales.
2. The mountains of south-west Ireland resemble the hills of Devon and Cornwall in structure, although they are much higher.
3. The Mourne Mountains of north-east Ireland appear to be continuations of the Southern Uplands of Scotland.
4. The volcanic rocks of Antrim resemble those of the islands of Mull and Skye.
5. Donegal has all the structure-features of Argyll.

### THE CENTRAL PLAIN

Ireland consists of a great central limestone plain with broken mountain masses lying mainly north and south of it.

The Central Plain is the most prominent feature of the relief of Ireland. It consists chiefly of limestone. Above the limestone in past ages lay other rocks, of which the most important were the coal measures; but most of these rocks have been worn away, exposing



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a broad expanse of limestone. Here and there isolated masses of the overlying rocks stand out above the plain—the millstone grit, for instance (which forms many of the heights of the Pennines in England).

The limestone plain is deeply pitted with hollows in which lie lakes and bogs. When the ancient glaciers retreated they left behind them a thick layer of boulder clay, which, being impervious to water, held up the drainage in the hollows. Many of these water-filled hollows became overgrown and filled up with luxuriant growths of sphagnum moss, each generation of which lives and grows upon the decaying mass of the previous generation. In time a bog is formed—at first of soft, slimy, spongy mud, green and treacherous; but later of fairly solid and stiff mud, filled with moss-fibres, which becomes peat when dried. Bogs occur also on swampy spots on hill-slopes, and frequently overflow and slide in a soft, muddy mass into valleys, often burying farms and villages beneath the slime. About one-eighth of Ireland's total area is bog. The most extensive bog is the Bog of Allen, between the Liffey and the Shannon. Other very large bog areas occur in Western Ireland, especially in Mayo.

Ireland is almost without coal; so the peat of the bog-lands is important for fuel. The peat is dug out with long, narrow spades, and stacked in piles to dry. Trunks of old trees—especially oak—are found in the bogs; the wood is extensively used for the manufacture of trinkets and souvenirs for visitors and tourists.

Through the Central Plain runs the Shannon (250 miles long), the longest river in the British Isles. But it traverses an area which is not highly productive, and which has no great manufacturing industries; so that, economically, the Shannon is of

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much less importance than many a river in Britain less than half its length. It flows through several lakes, of which the chief are Allen, Ree, and Dearg ; and it has several large tributaries, of which the two longest are the Brosna and the Suck. For most of its course the Shannon is a sluggish, peat-brown river. At its source it is less than 170 feet above sea-level. There is one part of the river, however, where the current is swift enough to form a series of 'rapids.' This is where the river cuts its way through the famous Gorge of Killaloe. Boats going upstream avoid the 'rapids' by using the canal which has been cut round them.

### THE NORTH

The chief features of the North of Ireland are (1) the great granite masses of Donegal ; (2) the volcanic plateau of Antrim ; (3) the Mourne Mountains.

Between the Antrim Plateau and the Sperrin Mountains runs the Bann from Lough Neagh (155 square miles), the largest lake in the British Isles. Between the Sperrin Mountains and the Mountains of Donegal runs the Foyle, into the wide estuary of Lough Foyle, at the head of which stands Londonderry. Moville, the port of call for liners proceeding to America, stands on the western shore of the Lough, nearer the open sea.

An interesting feature of the volcanic plateau of Antrim is the Giants' Causeway. It consists of a large number of basaltic columns, which extend for some distance into the sea ; their structure and origin are similar to those of Fingal's Cave in Staffa, which has been fully dealt with in the lesson on the Highlands and Islands of Scotland. The Giants' Causeway lies a few miles east of Portrush, and not far from the mouth of the Bann.

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South of the Donegal mountain mass is the remarkable Erne system of rivers and lakes draining into Donegal Bay.

### THE SOUTH

The highest mountains in Ireland are in the south-west, where a remarkable series of parallel ranges stretch out into the Atlantic, with wide inlets between. Macgillycuddy's Reeks, among the mountains of Kerry, are the most famous; they contain Carrantual, the highest peak in Ireland (3,414 feet—a little lower than Snowdon; a little higher than Scafell Pike). Here, too, is Ireland's most famous beauty spot—Killarney, with its glorious lakes, which attracts thousands of tourists every year from all parts of the United Kingdom.

The Galtee Mountains and the Knockmealdown Mountains lie farther east, between the Suir and Blackwater. Notice here the parallelism of the rivers Bandon, Lee, Blackwater, and Suir—the natural result of the parallelism of the mountain ranges.

The Wicklow Mountains are chiefly of granite, and are really a dissected plateau. They are famous in Irish song and legend, and contained the renowned Vale of Avoca. The Liffey curves round their northern shoulder; the Slaney rises amid their domed summits, and flows southwards into the wide Wexford Harbour. Parallel with the Slaney, but farther to the west, is the river Barrow, which with the Nore and the Suir, goes to form the deep inlet of Waterford Harbour.

### THE WEST

Between Galway Bay and Sligo Bay, Ireland juts out Atlantic-wards in the wild mountain and moorland of Connemara, which lies to the west of a great chain of lakes—Corrib, Mask, Carra, and Conn.

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Among these mountains lie considerable stretches of plain; but pastoral occupations prevail, and population is scanty.

Off the western coast lies Achill Island, which has steep high cliffs facing the open ocean. From Achill and the barren lands on the mainland, the Irish peasants regularly migrate every spring to Scotland, where they work as field labourers through the summer, returning home in the autumn with sufficient money saved to carry them over the winter.

The scenery of Connemara has a wild charm of its own, and the district is becoming more and more the resort of the better type of holiday-seekers. 'It is in the evening, especially among the bogs, that this West of Ireland is perhaps most enchanting, when the greens of grass and foliage—always richer than the greens of England—deepen through Prussian blue to indigo; the tawny bog turns to rose-madder and warm sepia, and the grey walls darken to purple.'

### CLIMATE

The climate of Ireland is, generally speaking, milder and wetter than that of England, and the range of temperature is less than that of most places in the same latitude in the sister isle.

The western half of the island is the wetter, for its highlands lie in the path of the prevailing wet westerlies from the Atlantic. The heaviest rainfall is experienced among the mountains of Kerry. Valencia has an average annual rainfall of fifty-five inches; but Dublin in the much drier east has an average rainfall of less than twenty-nine inches.

The greatest range of temperature is in the east-central district; but even there it is not much more than 25° F. All along the western and south-western

## *Geography of the Homeland*

coastlands the range is less than 16° F.—the effect of the warm Atlantic and the prevalent westerlies. In south-eastern England the range is over 24° F. Ireland as a whole, however, has less sunshine than England, more than half the island having less than 1,400 hours annually on the average.

The mildness of the climate, and the widely distributed rains give Ireland that wonderful freshness of greenery which justifies its poetic name of 'The Emerald Isle.'

Ireland's prosperity depends very largely upon its relations with Great Britain, for between Ireland and Great Britain flows the greater part of Ireland's commerce.

### CROSS CHANNEL ROUTES

There are several important 'ferries,' by which communication is maintained between Ireland and Great Britain. The shortest route is between Portpatrick in Scotland and Donaghadee in County Down, which is no longer than that across the Strait of Dover between Dover and Calais. But it has the disadvantage that it lies far away from the great industrial centres of the English Midlands. The most convenient route is Holyhead and Kingstown (for Dublin), a distance of nearly sixty miles. The chief cross-Channel routes are :—

- (1) Stranraer—Larne or Portpatrick—Donaghadee.
- (2) The Midland Route, Heysham—Belfast (111 miles).
- (3) The London and North-Western Routes :
  - (a) Liverpool-Dublin (121 miles).
  - (b) Liverpool-Belfast.
  - (c) Holyhead-Dublin (57 miles).
  - (d) Holyhead-Greenore (70 miles).



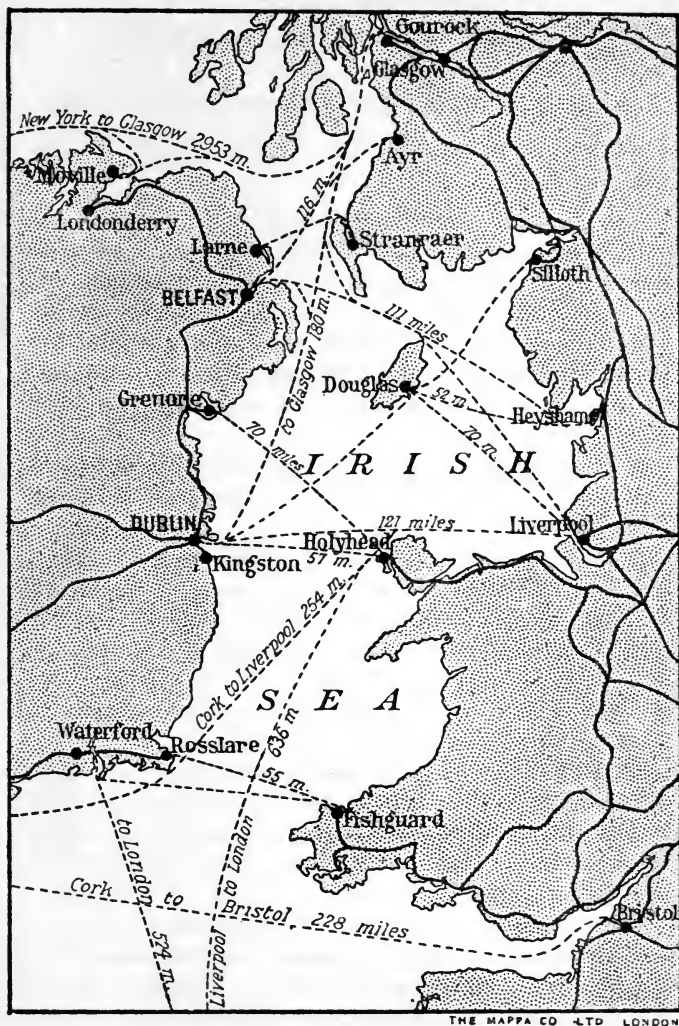


FIG. 30.—CROSS-CHANNEL ROUTES TO IRELAND

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(4) The Great Western Route, Fishguard-Rosslare (55 miles).

(5) Bristol-Cork (for trading steamers) (228 miles).

These routes are clearly indicated on the accompanying map.

### IRISH RAILWAYS

The chief engineering difficulties in railway construction in Ireland are the bridging of rivers and the crossing of bog-land. Of these the latter is by far the more serious, for railways—and roads—crossing bogs may have to be built upon solid causeways resting upon the rock below the bog, thirty or forty feet beneath.

The great focus of railways is Dublin, the Irish metropolis, which is the natural gateway of the whole island.

Ireland has over 3,400 miles of railways, but there are many different companies who do not always work well together, so that railway transport in Ireland has not been nearly as efficient as it might be. Under the Ministry of Transport, however, an Irish Director of Transport has been appointed, and better railway facilities are to be expected.

The three main trunk lines are (1) the Great Northern of Ireland, which is the most important; (2) the Great Southern and Western; and (3) The Midland Great Western. Their main routes are shown on the map, p. 193.

*The Great Northern* runs from Dublin to Belfast, and serves the important centres of Drogheda, Dundalk, Portadown, Lurgan, and Lisburn. Branches run to Londonderry, Enniskillen, Newry, Clones, and Armagh, and all towns in the important industrial areas of Northern Ireland.

## *Ireland—I*

*The Great Southern and Western* is the largest railway in Ireland. Its main line runs from Dublin to Cork and Queenstown by way of Kildare, Maryborough, and Mallow. Branches link Cork and Dublin with Limerick, Rosslare, Waterford, Tipperary, Clonmel, Kilkenny, and Tralee. It is the railway which gives tourists easy access to the beautiful Lakes of Killarney, and the mountain scenery of County Kerry.

*The Midland and Great Western* runs from Dublin across the middle of Ireland, via Maynooth, Mullingar, Athlone, and Galway, to Clifden, the great wireless station, on the west coast. From Mullingar a branch runs north-west to Sligo; from Athlone another runs to Claremorris and Clew Bay. It is the line of communication between Connaught and Dublin.

### IRISH CANALS

Ireland is exceedingly well supplied with waterways, but few are used as well as they might be. Like many English canals, the great Irish canals have fallen into decay, and have never been commercially successful.

The two great Irish canal systems are (1) the Northern System, and (2) the Shannon System.

*The Northern System* includes (1) the *Ulster Canal*, linking Monaghan and Clones with Lough Erne; (2) the *Lagan Canal*, connecting Belfast and Lisburn with Lough Neagh; (3) the *Newry Navigation and Ship Canal*, linking Carlingford Lough with the Bann.

*The Shannon System* is very much larger. It includes (1) *The Royal Canal*, which cost £1,500,000 to construct, and links Dublin with Richmond Harbour on the Shannon, following the course of the Midland Great Western as far as Mullingar. (2) *The Grand Canal*, the best in Ireland, running from Dublin through

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Tullamore, across the Shannon to Ballinasloe on the Suck, with a southern branch to Athy-on-the-Barrow. Its main route is nearly 100 miles in length. (3) The Shannon Navigation from Shannon Harbour to Limerick on the lower Shannon.

For some time there has been a proposal to link the two great canal and river systems by a new canal between Ballinamore and Ballyconnell in County Leitrim. This would place Limerick in direct water-communication with Belfast and the industrial north.

## IRELAND—II

THE population of Ireland at the last census (1911) was 4,390,219 (rather less than that of Scotland). This figure is less than it was in 1801. In 1841 the population was nearly double what it is now. The gradual decrease of population in Ireland has been mainly due to emigration. According to the Statesman's Year Book the total number of Irish emigrants from 1851 to 1916 was 4,314,781.

Emigration is a resource of a population which finds that its native land cannot support it. Ireland is naturally a pastoral agricultural country, and many regions are of such a character that farming is impossible, and the peasantry are forced to exist in dire poverty. Irish labourers and farmers have emigrated in large numbers to the United States and Canada, where they find better opportunities than they could ever hope for in the Emerald Isle.

In many rural districts the land cannot support its population. Such districts are known as 'congested areas,' and in past years have been subject to periods of famine and distress which have been difficult to alleviate. A Congested Districts Board has been established to cope with the difficulty, and since its work began in 1891 has done much by reviving old home industries, by opening relief works, by better education, by helping Irishmen to buy their own little farms, and by teaching them how to build better houses and how to farm scientifically. The result has been to make the peasantry of the remote rural districts of Ireland happier, healthier, and more prosperous.

The population map indicates a greater evenness of distribution than in either England and Wales or in Scotland. There are only two great centres of

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relatively dense population around Belfast and around Dublin. Belfast is the great industrial centre of Ireland, and Dublin is the Metropolis. Elsewhere agricultural and pastoral occupations prevail, with the result that except in mountainous areas and in the bog lands, the population is evenly spread. Contrast this with the population of Scotland, which is mainly concentrated in the industrial area of the Lowland Rift Valley ; and with that of Wales, where there is a similar aggregation on the South Wales Coalfield.

Ireland is poor in minerals, especially in the coal and iron necessary for the development of manufactures on a large scale. Thus the greater number of the people are occupied in farming of one kind or another, and population is thinly but more or less evenly spread over the country.

The rearing of cattle, pigs, and horses is much more important than agriculture. Scarcely a tenth of all Ireland is under the plough, and the rich pastures make stock-breeding and dairy farming profitable occupations. There is more arable land in the drier eastern half of the country than in the wetter western half.

### CATTLE REARING AND DAIRY FARMING

The mild climate permits of cattle living in the fields under natural conditions for nearly all the year, and the rich grass provides abundant ' feed ' for them. Ireland is, in fact, one of the finest cattle-breeding countries in the world, although full use has never yet been made of her advantages.

At most country towns great fairs are held every month, where cattle and other live stock are bought and sold. The biggest stock farms are in Meath and Kildare, and from these counties large numbers of

## *Ireland—II*

cattle are sent to England and Scotland as 'store cattle.'

Pig breeding is very important, as is to be expected in a country where small farms are the rule, and where much dairy farming is carried on. Irish hams and bacon stand high for quality among the world's production, especially those cured in the region of Londonderry, Ballymena, and Belfast in the north, and around Limerick, Cork, Waterford, and Tralee in the south.

The dairy industry in Ireland suffered severely from Danish competition, and declined in importance year after year until the beginning of the great co-operative movement which has almost restored the industry to its former prosperity. There are now over 400 'dairy societies,' with a total membership of more than 50,000 farmers. These societies own their own scientific creameries for the production of butter and cheese on a large scale. To these the farmers send their milk, and by this plan of co-operation are sure of a steady market and good prices.

The importance of cattle rearing and dairy farming to Ireland is realised when we find that more than 25 per cent of the total export trade of the country is in cattle and dairy produce.

Ireland is famous, too, for fine thoroughbred horses, especially those used for racing, hunting, and steeple-chasing.

### AGRICULTURE

Oats and barley are the main grain crops. The country generally is too wet for the cultivation of wheat on a big scale. Potatoes are very widely grown; so are various other root crops.

The most important agricultural region in Ireland

## *Geography of the Homeland*

is in Ulster, especially in the counties around Lough Neagh.

Another very important crop is flax, chiefly grown in Ulster. Since 1914 flax has been cultivated successfully in Munster also. It is said that Ireland is capable of growing sufficient flax to keep all the linen mills of the United Kingdom fully supplied with raw material. Irish flax is better than Russian flax, for it is much finer and tougher.

### COAL AND PEAT

The chief Irish coalfields are :—

- (a) The Kilkenny or Leinster coalfield in Kilkenny and Queen's County, where anthracite coal of high quality is mined.
- (b) The Lough Allen Coalfield in Roscommon, Leitrim, and Sligo.
- (c) The Tipperary Coalfield worked at the Slieveardagh collieries.
- (d) The Dungannon Coalfield.

Coal occurs elsewhere, but in small detached deposits, which up to the present have scarcely been worth the working.

Ireland's poverty in coal has forced the Irish manufacturer to import his fuel from the Scottish coalfields or from the Cumberland Coalfield on the other side of the Irish Sea.

For home use, the abundance of excellent peat compensates to a large extent for the lack of good house-coal. Some 3,000,000 acres—about one-seventh of the total area of Ireland—are covered with peat. Half of this lies in the lowland bogs of the Central Plain ; the rest occurs among the hills as ' mountain '



## *Ireland—II*

bogs. Nearly three-quarters of the country folk depend altogether upon peat, and peat-cutting and drying are important occupations in the bog-lands.

The old copper-mining industry of the Wicklow Hills is being revived, and mining for copper is beginning in County Cork. Lead is worked at Glendalough, in Wicklow, and at Ballysodare, in Sligo. Zinc is obtained in Tipperary. Valuable granites and marbles and other building-stones occur in mountainous regions.

### MANUFACTURES AND TOWNS

Perhaps the greatest Irish manufacturing industry is linen weaving, which has grown from a home industry to a flourishing factory industry during the past century. The growth of flax in Ulster and the spinning and weaving of the flax in the cottages of the peasantry for centuries, have led to the growth of the great linen industry of Belfast, Londonderry, and smaller centres in the northern half of Ireland—Newtownards, Lisburn, Lurgan, Ballymena, etc.

Besides the weaving of homespun tweeds in Donegal and the west, woollen mills on a considerable scale are at work at Athlone, Kilkenny, Dublin, Lucan, and other centres. Dublin is famous for its Irish poplins.

Hosiery manufacture began at Balbriggan, not far north of Dublin, in 1780. Since that time 'Balbriggan' hosiery has become famous, and the industry has spread to the linen towns and other centres.

Other industries which are prospering are lace manufacture, carpet-weaving, (using the old Celtic designs), rope making, and pottery manufacture.

Limerick is famous for its lace; Belfast for rope; Dun Emer for carpets; Waterford for glass; Wexford, Dublin, and Belfast for pottery.

## *Geography of the Homeland*

Another famous Irish industry is the ship-building, chiefly centred at Belfast, where the famous yards of Harland & Wolff are situated. Belfast is conveniently placed for the import of coal from the Scottish coalfields, and of iron from the Furness District of North Lancashire. It has a splendid harbour. In its yards some of the largest liners in the world have been built, and during the Great War several monitors and destroyers were constructed. Londonderry, Larne, Dublin, and Queenstown are also engaged in ship-building.

### OTHER TOWNS

Drogheda and Dundalk are ports, and manufacture linen. Armagh is the seat of an Archbishopric. Moville is a port of call for American liners in the north, as Queenstown is in the south.

Limerick makes lace and fish-hooks, and has tanning and bacon industries. Galway, on its fine bay, is only a small port because it has no great manufacturing area behind it.

Tipperary, Clonmel, and Cashel are agricultural and market towns in the rich 'Golden Vale' of Ireland.



LULWORTH COVE, DORSET

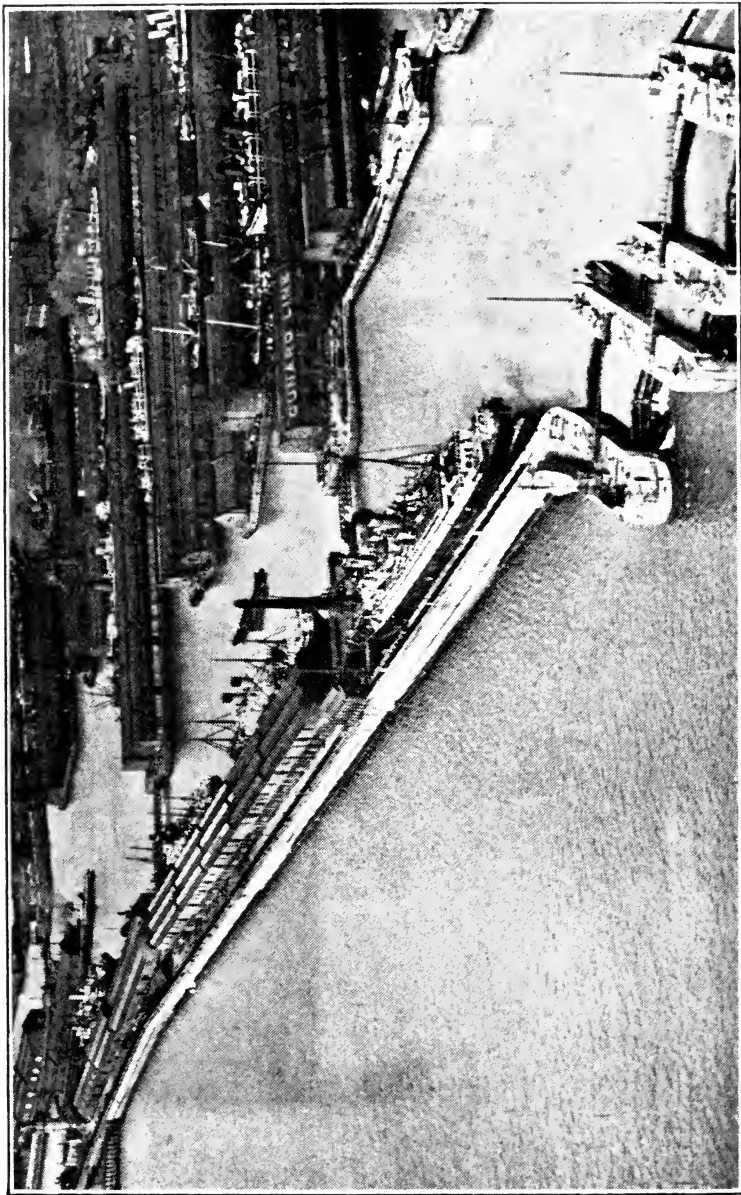
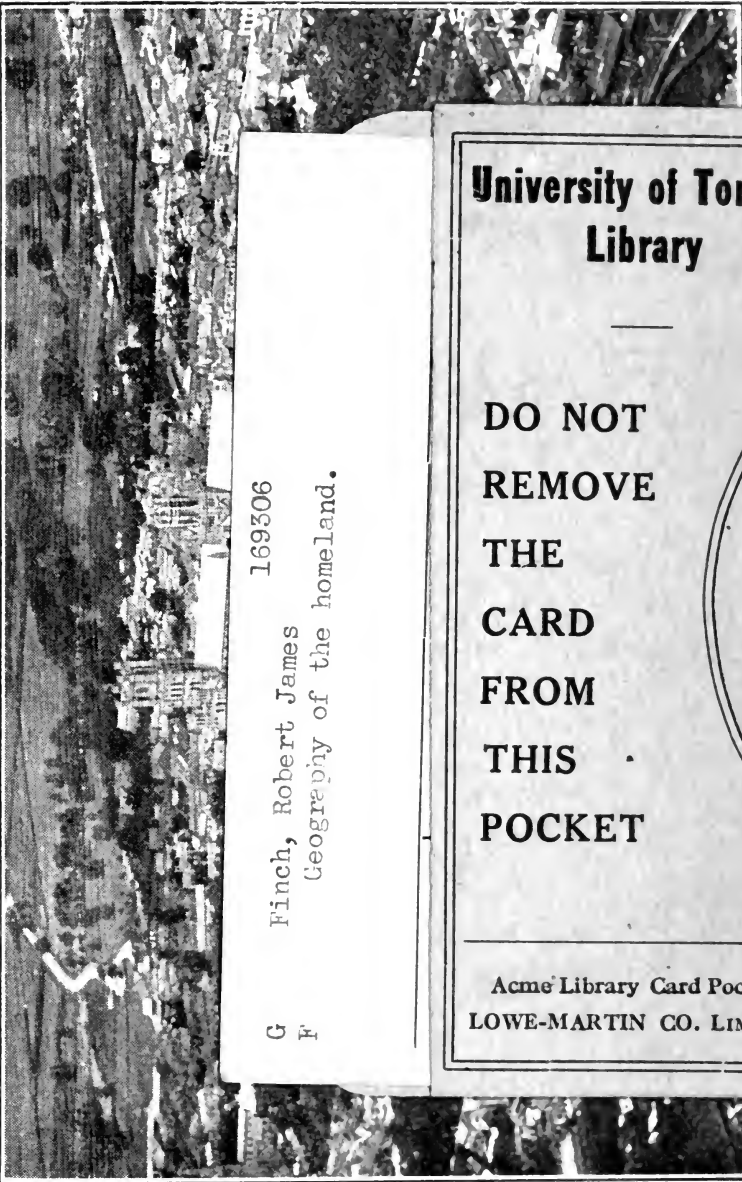


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